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THESIS

PREDICTING THE EFFECT OF MARINE CORPS SELECTIVE REENLISTMENT BONUSES IN THE POST-9/11 ERA: INTEGRATING THE EFFECTS OF DEPLOYMENT TEMPO

by

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March 2009

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This thesis explores the predictive effects of the Marine Corps Selective Reenlistment Bonus (SRB) on first-term retention while controlling for varying levels of deployment tempo. In order to successfully predict reenlistment decisions in the current era, the model must control for conditions that affect a Marine's choice to reenlist, none being more influential than deployments to Operation Iraqi/Enduring Freedom. Adding deployment tempo variables to the logit prediction model enables Marine Corps manpower planners to properly account for changing conditions in the "Long War."

The results of this analysis find the increased deployment tempo in recent years has had a negative affect on reenlistments. To counter this effect the Marine Corps has steadily increased its SRB budget and subsequent SRB offers to all Marines. In order to improve the accuracy of reenlistment predictions, this thesis estimated a model with alternative indicators of deployment tempo. The model developed is parsimonious, yet predicts accurately. Validation results show that if the model was utilized to predict FY07 reenlistment rates, it would have average prediction errors of 12 percent for the 27 high-density MOSs, who make up nearly 61 percent of the first-term population.

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PREDICTING THE EFFECT OF MARINE CORPS SELECTIVE REENLISTMENT BONUSES IN THE POST- 9/11 ERA: INTEGRATING THE EFFECTS OF DEPLOYMENT TEMPO

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This thesis explores the predictive effects of the Marine Corps Selective Reenlistment Bonus (SRB) on first-term retention while controlling for varying levels of deployment tempo. In order to successfully predict reenlistment decisions in the current era, the model must control for conditions that affect a Marine's choice to reenlist, none being more influential than deployments to Operation Iraqi/Enduring Freedom. Adding deployment tempo variables to the logit prediction model enables Marine Corps manpower planners to properly account for changing conditions in the "Long War."

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I. INTRODUCTION

A. BACKGROUND

The Marine Corps was authorized in 2007 to increase its active duty end strength from 175,000 to 202,000. Additionally, the Global War on Terror has become the Long War and the Marine Corps is facing continued high levels of deployment tempo. Even with these two constraints, the Marine Corps continues to meet its first-term retention goals. Meeting these retention goals has come at cost: a steep increase in the amount and number of Selective Reenlistment Bonuses (SRBs) offered to Marines. According to the Marine Corps SRB Planner, Captain Paul Bock, the SRB budget has increased from $58 million in Fiscal Year 2002 to $268 million in Fiscal Year 2007.[1] The increased deployment tempo from the Long War and end strength increases are the reasons for this increase in SRB payments offered.

The main tool utilized by Marine Corps Manpower Planners to appropriately shape the force is the SRB program. The goal of the SRB program is to attract and retain the desired number of Marines each fiscal year (FY) by offering a monetary incentive to reenlistment-eligible Marines. However, the SRB Program is limited by appropriations each FY by Congress and this pool of funding is limited. This budget constraint poses a problem for Marine Corps Manpower Planners in determining how much and to whom they offer SRBs to each FY in order to shape the force to the desired manning levels.

B. PURPOSE

The purpose of this thesis is to examine the predictive effects of the Marine Corps Selective Reenlistment Bonus on first-term retention when controlling for varying levels of deployment tempo. Given the required end strength increase and sustained high deployment tempo during the Long War, the SRB Program will serve as a critical

[1] Paul Bock, e-mail to author, October 22, 2008.

component in shaping the force for the future. Ultimately, this thesis will propose a new model for Marine Corps Manpower Planners to utilize in forecasting SRB amounts to be offered each fiscal year.

C. RESEARCH QUESTIONS

1. Primary Research Questions

How has the increased deployment tempo since 9/11 affected first-term enlisted reenlistment rates by MOS?

Has the increased deployment tempo affected the magnitude of the effect of SRBs on reenlistment behavior?

2. Secondary Research Questions

Is there a difference in reenlistment rates for Marines with and without dependents?

What are the effects of not deploying at all on individuals' reenlistment decisions?

D. BENEFITS OF THE STUDY

This study will provide the Marine Corps with a statistical analysis of reenlistment behavior for first-term Marines in the Post-9/11 Era. It will also provide an easily updatable model from which Marine Corps Manpower Planners can determine SRB levels by Military Occupational Specialty (MOS) for an upcoming fiscal year. The results from the model in this thesis can be compared to the prediction model currently in use by the SRB Planner.

E. SCOPE AND METHODOLOGY

This thesis analyzes the current SRB Model utilized by the Marine Corps. It also analyzes the effects of both deployment and SRB offers on reenlistment decisions for first-term enlisted Marines. The data used for this research was obtained by the Marine Corps Total Force Data Warehouse (TFDW) and includes three datasets. The first dataset contains reenlistment and separation personnel data for first-term Marines from

FY03 through FY07. The second dataset contains SRB payments made during the same timeframe. The third dataset contains deployment data for all Marines from FY03 through FY07. This study is primarily quantitative in nature, utilizing a multivariate logistic analysis to predict the effects of SRB offers and deployment tempo on individual reenlistment behavior.

F. OVERVIEW OF THE SELECTIVE REENLISTMENT BONUS PROGRAM

The general concept of the SRB Program is outlined in Marine Corps Order 7220.24M as follows:

> The SRB program was established to assist in attaining and sustaining adequate numbers of career enlisted personnel in designate Military Occupational Specialties (MOS's) and within particular years-of-service groupings. The program provides a monetary incentive for a reenlistment of at least 4 years at three career decision points during the first 14 years of service. Marine Corps Bulleting 7220 series, published separately and revised as required to meet the needs of the Marine Corps, identify MOS's eligible for a SRB and their multiples. The intent of this program is that Marines who receive a bonus for reenlistment in a particular skill serve the entire period of reenlistment in that skill.[2]

The Marine Corps pays the SRB in a lump-sum payment to Marines upon an eligible reenlistment. The amount paid is determined by rank and MOS at time of reenlistment, and length of the reenlistment term. For Zone A, first-term Marines, there are three rank categories; E-3 and below, E-4, and E-5 and above.[3] Zone A eligible Marines are defined as those possessing "17 months to 6 years of active Marine Corps Service of which at least 17 months was continuous active service other than for training."[4] Additionally, there have been recent changes to the way that SRB payments

[2] Marine Corps Order 7220.24M, Subject: Selective Reenlistment Bonus Program, May 1990, 1-2.

[3] Marine Corps Administrative Message, Subject: MCBUL 7220 Fiscal Year 2009 (FY09) Selective Reenlistment Bonus (SRB) Program and FY09 Broken Service SRB (BSSRB) Program, June 2008, 1.

[4] Ibid., 1.

amounts are calculated. In years past, prior to FY08, the payment was based on the product of a Marine's base pay, additional years of obligated service, and an SRB multiple (1-5).[5]

There have also been yearly increases in the maximum amount of SRB that can be paid to an eligible reenlisting Marine. For FY09 the total amount paid for an SRB cannot exceed $90,000.[6] This amount has increased dramatically since the onset of the Global War on Terror. In comparison to FY09, the cap for FY02 SRB payments was limited to $30,000 for Zone A reenlistments.[7] This change highlights the importance of using the SRB as the primary retention tool for Marine Corps Manpower Planners. This importance is also highlighted in the most recent MCBUL 7220 which states:

> Retaining our combat experienced Marines, and their combat experienced leaders, is one of the Commandant's highest priorities and is a crucial component of achieving the future 202k Marine Corps.[8]

Clearly, the SRB Program will be a vital component in shaping the force of the Marine Corps during the current heightened deployment cycle and push to increase the force to 202,000 Marines.

G. SUMMARY

This thesis analyzes the current Marine Corps SRB program and how the increased deployment tempo since the onset of the Global War on Terror has affected reenlistment behavior of first-term Marines, focusing on the effect of SRB payments. The results of this study will be of significant value to Marine Corps Manpower Planners in determining the appropriate rate of SRB payment to offer to each MOS in shaping the force for the Long War and continued high level of deployment tempo experienced by the Marine Corps. Ultimately, this study will provide manpower planners with an easily

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[5] Marine Corps Administrative Message, Subject: MCBUL 7220 Fiscal Year 2007 (FY07) Selective Reenlistment Bonus (SRB) Program, July 2006, 1.

[6] Ibid., 1.

[7] Marine Corps Administrative Message, Subject: MCBUL 7220 Multiples for the Fiscal Year 2002 (FY02) Selective Reenlistment Bonus (SRB) Program, September 2001, 1.

[8] Ibid., 1.

updatable spreadsheet, based on multivariate logistical regressions, which will allow forecasting of SRB payment offers in order to shape the force to the desired levels.

H. ORGANIZATION OF THE STUDY

This study is organized into five chapters. Chapter II is a literature review of several previous studies on the Marine Corps SRB Program, as well as the impacts of the Long War and its associated deployment tempo on reenlistment behavior. This chapter provides an in-depth look into how the Marine Corps determines what SRB amounts to be offered. It also examines how the increased deployment tempo since 9/11 has impacted individual reenlistment decisions. Chapter III describes the data utilized to conduct this research. This includes both descriptive and summary statistics, research methodology, and the general logistical regression models. This chapter describes in detail the data used and develops the hypothesized model for multivariate regression analysis. Chapter IV contains the results of the logistical regression models and introduces a Microsoft Excel Model for use by Marine Corps Manpower Planners. The multivariate results will predict reenlistment rates by Military Occupational Specialty (MOS). These results will be contained in the Microsoft Excel Model for use by manpower planners to determine SRB offers. Chapter V contains a validation of the prediction model along with some basic sensitivity analysis. Chapter VI concludes by summarizing the findings of the study and offering recommendations.

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II. LITERATURE REVIEW

A. CHAPTER OVERVIEW

The study of the effects of increases in deployment tempo for the Marine Corps has been an important theme since the onset of the Global War on Terror. The main focus of these Marine Corps-sponsored studies has been on the effect of deployments on retention. There have been far fewer studies that actually predict reenlistment rates. Specifically, one Center for Naval Analyses (CNA) study predicts reenlistment rates for a given Selective Reenlistment Bonus (SRB) level. However, this is a dated study that does not account for the current military environment. Being able to accurately predict reenlistment behavior is imperative in ensuring Marine Corps Manpower Planners can shape the force for the future.

Although there have been several recent studies on deployment tempo and its effects, none of them have tied in the predictive effects of the SRB program. This thesis looks at the current model and procedures for determining the SRB level, as well as incorporating the deployment tempo in order to formulate a new SRB model that utilizes more recent reenlistment data to better reflect present day conditions.

This chapter is divided into two main parts. This first part will present the current SRB model and its use by the Marine Corps. The second part will present five studies (four conducted by CNA and one by the RAND Corporation) that analyze how increases in deployment tempo have impacted Marine Corps retention. These studies share a common result in that the increased deployment tempo since 9/11 has negatively impacted reenlistment behavior in some way throughout the past several years.

B. CURRENT SRB MODEL

1. North (1994)

James H. North's analysis, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves" is the cornerstone from which the Marine Corps sets its SRB amounts to this day. According to the Marine Corps SRB planner,

Captain Paul Bock, the analysis derived in the North study is still used as an essential component in determining what SRB amounts are offered each fiscal year.[9] Each year the Center for Naval Analyses updates the prediction model produced by North and submits the new predictions to the Marine Corps. These predictions become the main part of the actual Marine Corps SRB model. CNA's logistic regression model is combined with a weighed average of the current inventory and future requirements to produce an SRB offer for each Military Occupational Specialty (MOS).[10]

North's study was composed of two key elements: estimating Marines reenlistment probabilities and estimating the costs of paying SRBs. He estimated reenlistment probabilities using historical reenlistment data from fiscal years 1987 through 1992 utilizing the CNA ARSTAT tracking file. The study focused on Zone A enlisted Marines making reenlistment decisions in their first 72 months of active service. The data population for each fiscal year included only those first-term Marines who either reenlisted or separated during that particular fiscal year, regardless of end of active service (EAS) date. To ensure he was getting reliable multivariate results he restricted his data to only those Marines that were recommended and eligible for reenlistment. This helped to negate any bias in his coefficient estimates due to Marines being in the sample that had no chance of reenlisting in the first place. One further data restriction to mitigate any potential bias was that he removed all MOS's that were classified as "restricted", meaning that there were limits placed on the number of Marines that could reenlist in a particular MOS. His final dataset contained 40,984 observations for the six fiscal years.

His statistical model was somewhat simple to ensure it could be replicated and used in a practical sense by manpower planners. He acknowledges that prior studies have shown that other factors, not included in his model, affect reenlistment behavior. However, he states his purpose is to "develop a model that accurately predicts reenlistment behavior and is easy to update."[11] Included in his model were economic

9 Paul Bock, e-mail to author, August 21, 2008.

10 Ibid.

11 James H. North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," Center for Naval Analyses, September 1994, 27.

factors that he hypothesized would affect reenlistment behavior. These included national unemployment rates for 20-24-year-old males and a military-to-civilian pay index. He also included dummy variables for the Marine's Occupational Field (OccField) and what level of SRB (0-5) the Marine received upon reenlisting. A multiple of zero indicated that the Marine did not receive an SRB payment offer. The final two controls in his model were for contract length (four versus six years) and whether or not it was the Marine's first enlistment contract. These six factors were used as controls, or independent variables, in his statistical analysis.

North utilized a logistical regression model in estimating reenlistment probabilities. This choice of model specification is due to reenlisting being a binary variable requiring the model to be nonlinear. His dependent variable, probability of reenlistment, was a function of the six controls described in the above paragraph. His results are somewhat intuitive. The results show that higher bonus levels, higher unemployment rates, and higher relative military to civilian pay are linked with higher reenlistment rates. Table 1 depicts his multivariate results. Utilizing the results from the logistical regression model he developed the estimated reenlistment probabilities by MOS.

Table 1. Logit coefficient estimates for Zone A reenlistments (FY1987 – 1992)[12]

	Mean Value	Coefficient	Derivative
SRB multiple level	1.487	0.374**	0.071
Six-year prior contract length	0.046	0.260**	0.050
Second enlistment contract	0.031	0.821**	0.157
Civilian unemployment rate	9.868	0.079**	0.015
Military-to-civilian pay ratio	121.72	0.011*	.002
Occfield			

[12] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 28-30.

01 Personnel and administration	0.056	1.789**	.342
02 Intelligence	0.005	0.033	0.006
04 Logistics	0.035	0.608**	0.116
08 Field artillery	0.039	0.269**	0.051
11 Utilities	0.017	0.199*	0.038
13 Engineer	0.064	0.338**	0.065
15 Printing and reproduction	0.001	1.847**	0.353
18 Tank and assault amphibious	0.011	0.149	0.028
21 Ordnance	0.034	0.402**	0.077
23 Ammunition	0.006	0.002	0.000
25 Operational communications	0.054	0.963**	0.184
26 Signal intelligence	0.012	-0.052	-0.010
28 Data/communications maintenance	0.027	0.025	0.005
30 Supply	0.085	1.288**	0.246
31 Traffic management	0.002	1.757**	0.336
33 Food service	0.020	0.821**	0.157
34 Audit, finance and accounting	0.008	1.007**	0.191
35 Motor transport	0.055	0.304**	0.058
40 Data systems	0.012	0.476**	0.091
41 Marine Corps exchange	0.001	2.963**	0.566
43 Public affairs	0.002	-0.184	-0.035
44 Legal services	0.004	0.930**	0.178
46 Training and visual information	0.002	0.887**	0.170

55 Music	0.009	1.353**	0.258
57 Nuclear, biological and chemical	0.004	0.534**	0.102
58 Military police and corrections	0.020	0.181	0.034
59 Electronics maintenance	0.015	0.087	0.017
60 Aircraft maintenance-fixed wing	0.078	0.275**	0.053
61 Aircraft maintenance-helicopter	0.052	0.330**	0.063
63 Avionics	0.039	0.078	0.015
64 Advanced avionics	0.031	0.151	0.029
65 Aviation ordnance	0.020	0.434**	0.083
68 Weather service	0.002	0.406	0.078
70 Airfield services	0.015	0.891**	0.170
72 Air control/air support	0.013	0.269*	0.051
73 Air traffic control and flight crews	0.009	-0.154	-0.030
Constant	1	-4.389**	
Mean Value of the dependent variable	0.257		

**Statistical significance at the 1-percent level. *Statistical significance at the 5-percent level.

He predicted reenlistment rates by OccField and SRB level for fiscal year 1995 using the results of the logistical regression model and estimates provided from Marine Corps Manpower Planners for the six control variables. Table 2 below depicts these results. Predicted reenlistment rates ranged from 9.4 percent (multiple of 0 for the Public Affairs OccField) to 94.0 percent (multiple of 5 for the Marine Corps Exchange OccField). He used these predicted rates to develop estimates of SRB program costs.

Table 2. Predicted FY 1995 reenlistment rates by occupational field and SRB multiple (percentages)[13]

	SRB Multiple					
Occfield	Zero	One	Two	Three	Four	Five
01 Personnel and administration	42.4	51.7	60.9	69.3	76.7	82.7
02 Intelligence	12.3	17.0	22.9	30.1	38.6	47.7
03 Infantry	10.6	14.7	20.1	26.8	34.7	43.6
04 Logistics	18.2	24.4	32.0	40.6	49.8	59.1
08 Field artillery	13.5	18.5	24.8	32.4	41.0	50.3
11 Utilities	12.8	17.6	23.7	31.1	39.6	48.8
13 Engineer	14.7	20.0	26.7	34.6	43.5	52.8
15 Printing and reproduction	42.5	51.8	61.0	69.5	76.8	82.8
18 Tank and assault amphibious	12.4	17.0	23.0	30.2	38.6	47.8
21 Ordnance	15.4	20.9	27.7	35.8	44.8	54.1
23 Ammunition	10.8	14.9	20.3	27.0	35.0	43.9
25 Operational communications	24.1	31.6	40.1	49.4	58.6	67.3
26 Signal intelligence	10.7	14.8	20.2	26.9	34.8	43.7
28 Data/communications maintenance	11.6	16.0	21.6	28.6	36.8	45.9
30 Supply	30.4	38.8	48.0	57.3	66.1	73.9
31 Traffic management	40.9	50.1	59.4	68.0	75.5	81.8
33 Food service	21.2	28.2	36.3	45.3	54.6	63.7
34 Audit, finance and accounting	26.1	33.9	42.8	52.1	61.2	69.6

[13]North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 34-35.

35 Motor transport	14.0	19.2	25.6	33.4	42.1	51.4
40 Data systems	16.2	21.9	29.0	37.2	46.3	55.6
41 Marine Corps exchange	70.7	77.8	83.6	88.1	91.5	94.0
43 Public affairs	9.4	13.1	18.0	24.2	31.7	40.3
44 Legal services	24.2	31.7	40.3	49.5	58.8	67.5
46 Training and visual information	22.1	29.2	37.5	46.6	55.9	64.8
55 Music	31.4	39.9	49.1	58.4	67.1	74.8
57 Nuclear, biological and chemical	17.3	23.4	30.7	39.2	48.4	57.7
58 Military police and corrections	12.7	17.5	23.5	30.9	39.4	48.6
59 Electronics maintenance	11.9	16.4	22.2	29.3	37.6	46.7
60 Aircraft maintenance-fixed wing	14.2	19.4	26.0	33.8	42.6	51.9
61 Aircraft maintenance-helicopter	14.8	20.1	26.8	34.7	43.6	52.9
63 Avionics	12.2	16.8	22.6	29.8	38.2	47.3
64 Advanced avionics	13.3	18.2	24.4	31.9	40.6	49.8
65 Aviation ordnance	16.1	21.8	28.9	37.1	46.2	55.5
68 Weather service	15.3	20.8	27.7	35.7	44.7	54.0
70 Airfield services	22.8	30.0	38.4	47.6	56.9	65.7
72 Air control/air support	13.6	18.7	25.0	32.7	41.4	50.6
73 Air traffic control and flight crews	9.2	12.9	17.7	23.8	31.2	39.8

Utilizing the predicted reenlistment rates derived from the logistical regression model North developed cost estimates. He calculated the “bonus cost of an additional reenlistment” for each OccField at each SRB level. The amounts calculated for additional bonus costs ranged from just over $17,000 to nearly $207,000 per additional

reenlistment. Essentially, the additional bonus cost is capturing the economic rent that is required to entice more Marines to reenlist. The higher economic rents are representative of OccFields that began with higher initial reenlistment rates (prior to an increase in the SRB multiple). These cost estimates can help manpower planners determine which OccFields are the most or least cost-effective to offer an SRB.

C. DEPLOYMENT TEMPO

1. Hattiangadi, Lee, and Quester (2005)

The Assistant Commandant of the Marine Corps asked the Center for Naval Analyses to examine the effects of deployment tempo on retention. In October 2005, CNA published the annotated briefing: "Deployment Tempo and Retention in the Marine Corps." This is the first in a series of CNA studies on deployment tempo and its effects on retention in the Marine Corps. The authors' results were based on both statistical analysis and input from focus groups.

The statistical analysis of their study focused on all Marines making reenlistment decisions in fiscal year 2004. The dataset was limited to those Marines who either reenlisted or separated during the fiscal year; regardless of their accession date, reenlistment zone, or end of active service (EAS) date. The dataset did not include Marines who were involuntarily separated or extended beyond fiscal year 2004. They analyzed reenlistment rates as a function of number of days deployed. The analysis shows that reenlistment rates drop as number of deployed days increase. The study also finds that as deployed days increase single Marines are far less likely to reenlist than their married counterparts. Figure 1 depicts the reenlistment rate for first-term Marines as a function of deployed days for both single and married Marines. The study also finds that single Marines deploy more heavily than do married Marines. In fact, for fiscal year 2004, single Marines averaged 49 more deployed days than married Marines. This issue was also addressed in the focus groups.

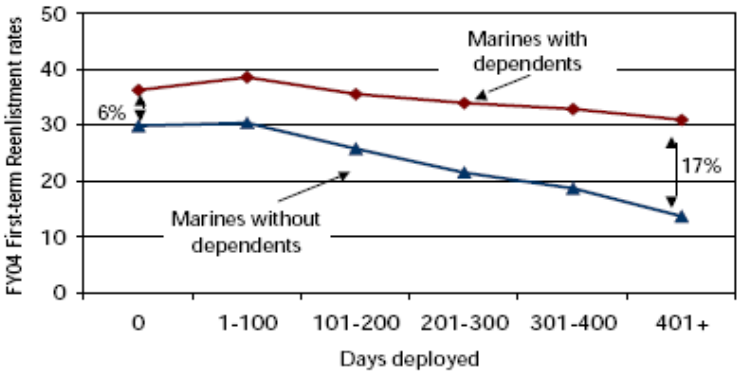

Figure 1. FY04 FTAP Reenlistment Rates[14]

The second part of their analysis was based on focus groups held throughout the Marine Corps. They conducted 26 focus groups, 13 from each coast. The focus groups were comprised of 20 to 30 Marines of varying grades and operational elements of the Marine Corps. Some of the key problems brought about from the focus groups were:

- Individual Augment (IA) assignments.
- Changing deployment dates and short time between deployments.
- Lost leave.
- Availability of downtime.
- Lack of opportunities for off-duty education.
- Single Marines chosen for quick fill deployments.

The authors made several recommendations based on their statistical analysis and the results of the focus groups. They describe their recommendations as "things that the Marine Corps could do to ease the stress that high deployment tempo causes."[15] The recommendations were: (1) Examine the possibilities for exchanges between heavy deployers and nondeployers; (2) Continue to review and validate the IA process; (3)

[14] A.U. Hattiangadi, and L.G. Lee, and A.O. Quester, "Deployment Tempo and Retention in the Marine Corps," Center for Naval Analyses, October 2005, 6.

[15] Ibid., 25.

Consider forward deployed education vans; and (4) Consider a wartime Regular Reenlistment Bonus for all. Several of these recommendations have already made their way into Marine Corps policy. For instance, in fiscal year 2007 the Marine Corps offered an assignment incentive pay bonus of $10,000 for all enlisted Marines.[16]

2. Hosek, Kavanagh, and Miller (2006)

In 2006, the RAND Corporation published the study; "How Deployments Affect Service Members." This study focused on how more recent deployments have affected military personnel from all branches of the armed forces. Their conceptual approach included analyzing the economical, sociological, and psychological effects of deployments on personnel. The authors' results were based on focus group research and statistical analysis of survey data.

Focus groups were conducted with both enlisted personnel and officers from each service during the first half of 2004. There was a wide array of topics covered, ranging from expectations of service life to deployment experiences. Deployment stress and the many ways it can be caused was one of the key topics discussed by service members. Even personnel who never deployed reported being stressed by deployments due to the increased workload and work hours. This resulted from shortages of personnel who were left behind to take care of business as usual. Even though there were many negative facets of deployments brought up, the focus groups also provide numerous positive facets of deploying. Two key examples of these positive aspects were increased pay and the opportunity for increased responsibility. Additionally, there were mixed opinions as to whether the deployment tempo would affect their reenlistment decisions.

The second part of their research was based on survey data collected by the Defense Manpower Data Center (DMDC). Their analysis of the data "focused on stress and the intention to stay in the military."[17] The overwhelming results of the survey analysis showed that factors which increased stress "decreased the likelihood of intention

[16] Marine Corps Administrative Message, Subject: MCBUL 7220 FY07 End Strength Incentive, February 2007, 1.

[17] J. Hosek, and J. Kavanagh, and L. Miller, "How Deployments Affect Servicemembers," RAND Corporation, 2006, 1.

to stay."[18] Some of these factors included longer than usual work days, uncertainty in deployments, and spousal attitudes. The author's note that these results are consistent with those found in the focus groups.

Based on their analysis the authors make several recommendations for policy and future research. Policy implications include:[19]

- Deployments should be spread widely across qualified service members and units rather than limited to repeatedly deploying the same individuals.
- Military official should examine additional ways to compensate personnel who are sent on long, difficult, or dangerous deployments or are deployed frequently.
- It is worth considering additional pay and recognition for nondeployed personnel who are often called upon to work longer than the usual duty-day.
- It may be worthwhile to consider ways to remove the stigma, or reluctance, to seek professional counseling and, further, to consider additional training to enable service members to be more effective in counseling or supporting one another.

They also recommend further research be conducted on the issue of how deployments affect reenlistment. They also note that: "future work should also revisit the question of how reenlistment bonuses and special pays affect reenlistment of personnel with extensive deployments."[20]

3. Quester, Hattiangadi, and Shuford (2006)

This study, "Marine Corps Retention in the Post 9/11 Era: The Effects of Deployment Tempo on Marines With and Without Dependents" is the second in a series of Marine Corps-sponsored studies by the Center for Naval Analyses on deployment tempo and retention specific to the Marine Corps. This study focused on deployment tempo and retention for fiscal year 2004, but also looked at fiscal years 2002 and 2003. The dataset for each fiscal year was limited to those Marines who either reenlisted or

[18] Hosek, and Kavanagh, and Miller, "How Deployments Affect Servicemembers," xix.

[19] Ibid., xxi-xxiii.

[20] Ibid., xxiv.

separated during the particular fiscal year; regardless of their accession date, reenlistment zone, or end of active service date. The dataset did not include Marines who were involuntarily separated or extended beyond the fiscal year being analyzed. The main finding for first-term Marines is that both not deploying at all and being heavily deployed resulted in lower reenlistment rates. The authors also found that single Marines are more negatively affected by high deployment tempo than their married counterparts.

The authors analyze two key factors affecting reenlistment decisions for first-term Marines. They first analyze the effects of number of days deployed on reenlistment rates. Figure 2 shows the reenlistment rates for fiscal year 2004 for first-term Marines as a function of number of days deployed in the current contract. Days deployed is defined as "the sum of five categories of time spent away from home: operational days, exercise days, unit training days, home station training days, and mission support temporary duty (TDY) days."[21] As deployed days increase, the associated reenlistment rate declines. Additionally, reenlistment rates are higher for those Marines that deploy 1-100 days compared with those who did not deploy at all.

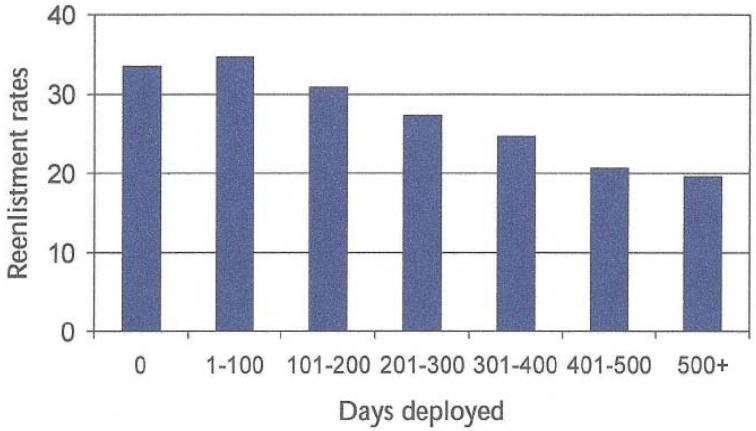

Figure 2. FY04 reenlistment rates for first-term (zone A) Marines, by number of days deployed[22]

[21] A.U. Hattiangadi, and R.W. Shuford, and A.O. Quester, "Marine Corps Retention in the Post 9/11 Era: The Effects of Deployment Tempo on Marines With and Without Dependents," Center for Naval Analyses, January 2006, 7.

[22] Ibid., 8.

The study next analyzes the effect of dependency status on reenlistment rates. They look at reenlistment rates from fiscal year 1995 through 2004 and the results are very significant. As shown in Figure 3, in each of the ten fiscal years first-term Marines with dependents reenlist at higher rates than those without dependents. This finding also holds true for second and third-term Marines in fiscal year 2004, although, the difference is much smaller than for first-termers. The authors also found that deployment to a crisis area decreased the probability of reenlistment.

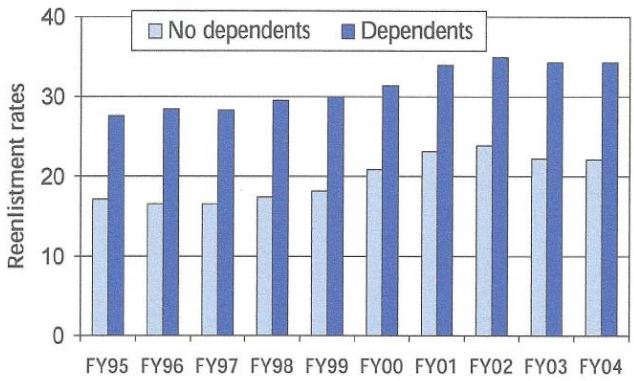

Figure 3. First-term reenlistment rates for Marines, by dependency status[23]

In their statistical analysis (multivariate logistic regression), they find that deployment to a crisis area reduces the probability of first-term reenlistment by 8percentage points, all else equal. This effect was fairly similar for Marines with and without dependents. They define a crisis area as "primarily Iraq or Afghanistan."[24] These results were compared to fiscal years 2002 and 2003.

Similar reenlistment models were constructed for fiscal years 2002 and 2003. For fiscal year 2002, deployment to a crisis area actually increased the reenlistment probability by 5 percentage points. This, however, could be due to deploying to a crisis area being far less common than in fiscal year 2004 (2 percent of Zone A Marines

[23] Hattiangadi, and Shuford, and Quester, "Marine Corps Retention in the Post 9/11 Era: The Effects of Deployment Tempo on Marines With and Without Dependents," 13.

24 Ibid., 13.

deployed to a crisis area in fiscal year 2002 compared to 49 percent in fiscal year 2004). For fiscal year 2003, deploying to a crisis area decreased the reenlistment probability by 16 percentage points.

The study also analyzed reenlistment and continuation patterns for career enlisted Marines and officers. As mentioned before, those without dependents reenlisted or continued at lower rates than did their counterparts with dependents. However, being heavily deployed had little to no effect on the reenlistment patterns of career Marines and had and increasing effect for the continuation of officers.

4. Quester, Hattiangadi, Lee, and Shuford (2006)

The Center for Naval Analyses study "Marine Corps Deployment Tempo and Retention in FY05" is very similar to the previous CNA study. However, it analyzed the deployment tempo and retention patterns specific to fiscal year 2005. The dataset was limited to those Marines who either reenlisted or separated during the fiscal year; regardless of their accession date, reenlistment zone, or end of active service date. The dataset did not include Marines who were involuntarily separated or extended beyond fiscal year 2005. For fiscal year 2005, there were several key differences in the reenlistment patterns of first-term Marines.

Despite similar differences in reenlistment rates for Marines with and without dependents, those Marines who were considered most heavily deployed (500+ days) actually had increasing reenlistment rates. This increase held true for both Marines with and without dependents. Figure 4 below shows this increase for both Marines with and without dependents. Similar to fiscal year 2004, being heavily deployed most affects Marines without dependents. Even with the increase for most heavily deployed Marines, being deployed to a crisis area still negatively affected reenlistments.

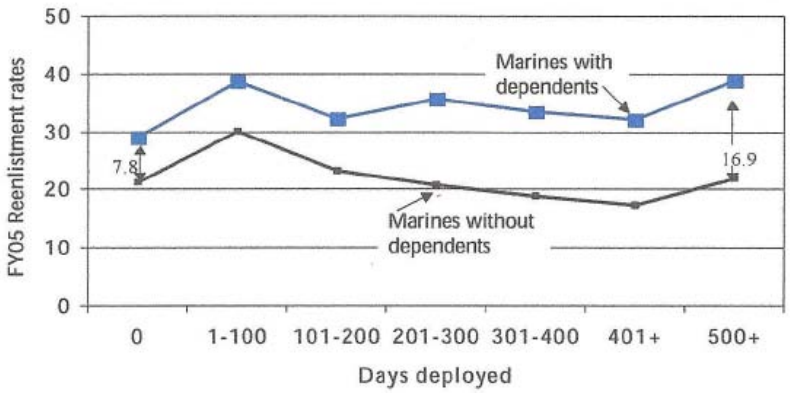

Figure 4. FY05 first-term reenlistment rates by days deployed for Marines with and without dependents[25]

Similar to 2004, deployments to a crisis area reduce reenlistment rates for first-term Marines. This is particularly true for multiple deployments to a crisis area. As a Marine's number of deployments to Iraq or Afghanistan increase, the reenlistment rate decreases. Also, Marines without dependents deployed an average of 57 more days than did Marines with dependents. This was very similar to the results found in the 2004 CNA study. Similar to their earlier studies they conducted logistic regressions for their statistical analysis.

Their statistical analysis consisted of logistic regressions to explain reenlistment behavior. The major findings for first-term Marines are:

- Reenlistment probabilities for Marines with dependents increase slowly as days increase until the number of days deployed reaches 500 days. At that point, they begin to increase more rapidly.
- Reenlistment probabilities for Marines without dependents decrease slowly as days deployed increase until the number of days deployed reaches 500 days. At that point, they increase.
- For Marines both with and without dependents, reenlistment probabilities decrease as the number of deployments to Iraq or Afghanistan increase.[26]

[25] A.U. Hattiangadi, and L.G. Lee, and A.O. Quester, "Marine Corps Deployment Tempo and Retention in FY05," Center for Naval Analyses, March 2006, 7.

[26] A.U. Hattiangadi, and L.G. Lee, and A.O. Quester, "Marine Corps Deployment Tempo and Retention in FY05," Center for Naval Analyses, March 2006, 11.

Statistical analysis of career enlisted Marines and officers showed that both number of days deployed and number of deployments to Iraq or Afghanistan increase the reenlistment and continuation rates almost across the board.

5. Lien, Quester, and Shuford (forthcoming, October 2008)

The most recent Center for Naval Analyses study on deployment tempo and retention is "Marine Corps Deployment Tempo and Retention from FY04 through FY07." This study takes on the same general theme as the previous two CNA studies on deployment tempo and retention. This study analyzed reenlistment decisions for fiscal years 2004 through 2007; however, it also did a separate analysis of fiscal year 2007. The dataset for each fiscal year was limited to those Marines who either reenlisted or separated during the particular fiscal year; regardless of their accession date, reenlistment zone, or end of active service date. The dataset did not include Marines who were involuntarily separated or extended beyond the fiscal year being analyzed. Overall findings are comparable with the previous studies in that deployment days and number of deployments to the Iran/Afghanistan country group reduce reenlistment rates. There are some subtle differences, though.

The study finds that overall reenlistment rates are affected by number of deployment days and number of deployments for first-term Marines. For the entire period, fiscal year 2004 through 2007, there is a negative relationship between number of days a Marine deploys and whether or not that Marine reenlists. The study also illustrates that the share of Marines deployed, both in terms of deployed at all and specifically to the Iran/Afghanistan country group, have increased from 2004 to 2007. In fiscal year 2004, 58 percent of first-term Marines deployed to the Iraq/Afghanistan country group at least once. In 2007, the percentage deployed at least once rose 20 points to 78 percent. Overall, there has been a gradual increase in the total number of deployed days experienced by first-term Marines.

Despite the increase in overall deployment days, there have not been substantial decreases in overall reenlistment rates. Figure 5 highlights that overall reenlistment rates have remained quite steady. In fact, there was a rather large increase in fiscal year 2007. This increase is highlighted by the authors in some detail.

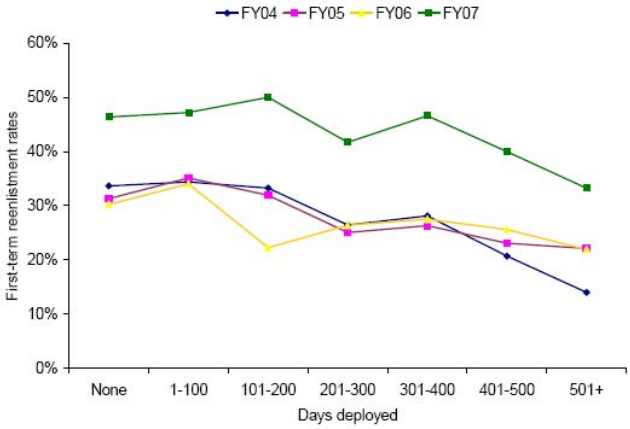

Figure 5. FTAP reenlistment rates by year of decision and number of days deployed[27]

This study finds that the reenlistment rate for first-term Marines in fiscal year 2007 is 41.9 percent. This is a significant increase over previous years. The authors highlight three reasons for this:

> (1) In FY07 there were no longer caps on the amount of first-term Marines that could reenlist.
>
> (2) Higher SRB amounts were offered.
>
> (3) Recommended and eligible first-term Marines that were to reenlist in FY08 were allowed to reenlist in FY07.[28]

This rate, however, differs from the official Marine Corps reenlistment rate. According to Captain Paul Bock, the Marine Corps SRB Planner, the official reenlistment rate for fiscal year 2007 was only 31.5 percent.[29] This large difference is likely due to differences in the population used. The official Marine Corps rate was derived from just those Marines who had an end of active service date in fiscal year 2007. The CNA reenlistment rate was derived from anyone that reenlisted in fiscal year 2007, regardless of EAS. As with the previous studies, this study also found that Marines without dependents were less likely to reenlist as deployments increased.

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[27] D. Lien, and A. Quester, and R. Shuford, "Marine Corps Deployment Tempo and Retention from FY04 through FY07," Center for Naval Analyses, October 2008, 11.

[28] Ibid., 9.

[29] Paul Bock, e-mail to author, September 22, 2008.

The statistical analysis consisted of multivariate logistic regressions very similar to the previous studies. Logistic regressions predicted reenlistment behavior for all four years and then just for fiscal year 2007. Some of the key findings are listed below:

- Days deployed decreased the probability of reenlistment for the entire period and for just fiscal year 2007.
- In all cases having dependents increased the probability of reenlistment.
- Number of deployments to Iraq/Afghanistan decreased the probability for reenlistment for Marines without dependents for the entire period. However, number of deployments to Iraq/Afghanistan increased the probability of reenlistment for Marines with and without dependents for fiscal year 2007.

Statistical analysis of career Marines and officers shows that there has been little to no effect of high deployment tempo on their reenlistment or continuation patterns. This is consistent with the analysis provided in earlier studies.

D. CHAPTER SUMMARY

This chapter has provided a review of the current SRB model, as well as published work on deployment tempo and how it affects retention. Several conclusions can be made from this review:

- Deployment tempo affects first-term Marine reenlistment behavior. Despite subtle changes from fiscal year to fiscal year, increased deployment leads to decreased reenlistment rates.
- Increased deployment tempo more negatively affects Marines without dependents than their counterparts with dependents.
- Deployment tempo has had little effect on the reenlistment behavior and continuation behavior of career Marines and officers.

This thesis builds upon the model produced by James H. North (1994) and incorporates the effects of deployment tempo on reenlistment decisions for first-term Marines. It also provides an easily updatable model to assist Marine Corps Manpower Planners in shaping the force that better accounts for the increased deployment tempo since 9/11.

III. DATA AND METHODOLOGY

A. DATA SOURCES

1. Total Force Data Warehouse

Two datasets were created from the Marine Corps' Total Force Data Warehouse (TFDW) that included background information on all enlisted Marines who made reenlistment decisions between fiscal years 2003 and 2007, including on their deployments. The first dataset included all reenlistment decisions. It also contained demographic variables including gender, marital status, race, and number of dependents. This dataset also included information on the Marine's rank, Military Occupational Specialty (MOS), End of Current Contract Date (ECC), and End of Active Service Date (EAS). The second dataset received from the TFDW included information on deployments for all Marines contained in the first dataset. These two datasets were merged with the Bureau of Labor Statistics data and Selective Reenlistment Bonus data as discussed below.

2. Bureau of Labor Statistics

The U.S. Bureau of Labor Statistics (BLS) warehouses current and historic labor force and economic data. Historic national-level unemployment rates and usual weekly earnings for 20-24 year males were retrieved from the BLS master database. The unemployment rate/information is based on a national-level monthly average for the period between 2002 and 2007. Similarly, the usual weekly earnings data is based on a national-level quarterly average of the usual weekly earnings for 20-24 year old males. These two variables are used in the reenlistment models as proxies for employment conditions in the civilian labor market.

3. United States Marine Corps

Each fiscal year the Marine Corps publishes a MCBUL 7220 that outlines the SRB offers by MOS for the upcoming fiscal year. These SRB offers were retrieved for each fiscal year and merged with the TFDW dataset by MOS and fiscal year.

B. VARIABLE DESCRIPTIONS

The final dataset for this analysis represents pooled cross-sectional data of enlisted first-term Marines who were "recommended and eligible" for reenlistment and who either reenlisted or separated. Variable descriptions for each variable used in this analysis are shown in Table 3. These descriptions represent the final merged product of the four datasets outlined above. Key variables of interest will be discussed at greater length in the following paragraphs.

Table 3. Descriptive Statistics for first-term Marines

Variable Name	Variable Description	Variable Type	Range
Dependent Variable			
reenlist	Marine's reenlistment decision	Binary	=1 if reenlisted; 0 otherwise
Independent Variables			
srb_multiple	SRB offered to eligible Marine	Continuous	0-5
total_gwot_deployments	Number of deployments iso OIF/OEF	Continuous	0-4
total_gwot_days_deployed	Number of days deployed iso OIF/OEF	Continuous	0-798
_0_gwot_deployments	No deployments iso OIF/OEF	Binary	=1 if no deployments; 0 otherwise
_1_gwot_deployments	1 deployment iso OIF/OEF	Binary	=1 if 1 deployment; 0 otherwise
_2_gwot_deployments	2 deployments iso OIF/OEF	Binary	=1 if 2 deployments; 0 otherwise
_3_or_more_gwot_deployments	3 or more deployments iso OIF/OEF	Binary	=1 if 3 or more deployments; 0 otherwise
_0_gwot_days_deployed	0 days deployed iso OIF/OEF	Binary	=1 if 0 days deployed; 0 otherwise
_1_to_100_gwot_days_deployed	1-100 days deployed iso OIF/OEF	Binary	=1 if 1-100 days deployed; 0 otherwise
_101_to_200_gwot_days_deployed	101-200 days deployed iso OIF/OEF	Binary	=1 if 101-200 days deployed; 0 otherwise
_201_to_300_gwot_days_deployed	201-300 days deployed iso OIF/OEF	Binary	=1 if 201-300 days deployed; 0 otherwise

_301_to_400_gwot_days_deployed	301-400 days deployed iso OIF/OEF	Binary	=1 if 301-400 days deployed; 0 otherwise
_more_than_400_gwot_days_deployed	More than 400 days deployed iso OIF/OEF	Binary	=1 if days deployed >400; 0 otherwise
unemployment_rate	National unemployment rate	Continuous	8.733-10.525
mil_civ_pay_ratio	Military to civilian pay ratio	Continuous	1.0479-1.1126
FY03	Fiscal year of ECC	Binary	=1 if ECC is in FY03; otherwise
FY04	Fiscal year of ECC	Binary	=1 if ECC is in FY04; 0 otherwise
FY05	Fiscal year of ECC	Binary	=1 if ECC is in FY05; 0 otherwise
FY06	Fiscal year of ECC	Binary	=1 if ECC is in FY06; 0 otherwise
FY07	Fiscal year of ECC	Binary	=1 if ECC is in FY07; 0 otherwise
married	Marital status	Binary	=1 if married; 0 otherwise
number_dependents	Number of dependents	Continuous	0-10
female	Sex	Binary	=1 if female; 0 otherwise
E3	Rank	Binary	=1 if E3; 0 otherwise
E4	Rank	Binary	=1 if E4; 0 otherwise
E5	Rank	Binary	=1 if E5; 0 otherwise
E6	Rank	Binary	=1 if E6; 0 otherwise
mos_*	Military Occupational Specialty	Binary	=1 if MOS indicated; 0 otherwise

*214 binary variables for each MOS. Appendix A is a MOS listing with titles.

1. Reenlistment Decisions

The reenlist variable is a binary variable that represents whether a Marine reenlisted or separated. The dataset was restricted to only those first-term Marines who were recommended and eligible for reenlistment. First-term Marines are defined by the Marine Corps as those Marines having "17 months to 6 years of active Marine Corps Service of which at least 17 months was continuous active service other than for

training."[30] If a Marine reenlisted during the period, he was included in the dataset as "1" for the reenlist variable. If a Marine did an extension, the End of Current Contract (ECC) date would be changed to reflect the extension and he would be included either later that fiscal year or in the next fiscal year, depending on the length of the extension. If a Marine separated for an honorable condition, he/she was included in the dataset as a "0" for the reenlist variable. If a Marine separated under non-honorable conditions, he/she was excluded from the dataset.

2. Selective Reenlistment Bonuses

The srb_multiple variable represents the Selective Reenlistment Bonus that was offered to a Marine during his reenlistment decision process. SRBs are offered in .5 increments ranging from 0 to 5. As previously stated, SRBs are offered to Marines in certain Military Occupational Specialties in an attempt to boost reenlistments.

3. Deployments to Operation Iraqi/Enduring Freedom

Deployment information was retrieved from the GWOT database contained in the TFDW. A deployment (or deployed days) is defined as any time spent in support of Operations Iraqi/Enduring Freedom (OIF/OEF). The Marine Corps tracks this information by use of a crisis remark code in their administrative system, the Marine Corps Total Force System (MCTFS). This data is in two forms: total number of deployments and total number of days deployed during the Marine's initial contract.

The variable names in the dataset for these two continuous variables are total_gwot_deployments and total_gwot_days_deployed, respectively. Marines in the dataset deployed anywhere from 0-4 times and the number of deployed days ranged from 0-798 days. The dataset also contains ten binary variables that were created from the two continuous variables. There are four binary variables that account for how many deployments the Marine participated in (0, 1, 2, and 3 or more). Additionally, there are six binary variables that account for the deployment tempo of a Marine, measured in days deployed (0, 1-100, 101-200, 201-300, 301-400, and more than 400).

[30] Marine Corps Order 7220.24M, Subject: Selective Reenlistment Bonus Program, May 1990, 1-2.

This study does not include data on what is considered "normal deployments." Normal deployments could represent a broad range of circumstances; ranging from Temporary Additional Duty (TAD) to non-combat related deployments with a Marine Expeditionary Unit (MEU). There have been several studies in the past that have concluded that these types of deployments have little to no affect on reenlistment behavior.[31] Therefore, this analysis will only consider deployments in support of OIF/OEF.

4. Economic Factors

Economic factors that are hypothesized to affect reenlistment decisions include unemployment rates and relative military pay. Included in the dataset are two variables to represent these factors: unemployment_rate and mil_civ_pay_ratio. The unemployment_rate variable represents the average national unemployment rate for 20-24 males. This average rate was matched to each individual Marine during his reenlistment decision fiscal year. The mil_civ_pay_ratio is a simple ratio of military to civilian pay for each fiscal year. Military pay was calculated for each fiscal year based on the current basic pay that an E-4 with four years of service would receive. This amount was utilized because the vast majority of Marines making reenlistment decisions are very close to four years of and nearly 60 percent are E-4's. The civilian pay was calculated as an annual average of the national-level usual weekly earnings for 20-24 year old males. For example in fiscal year 2007 an E-4 with four years of service earned $494.63 per week compared to the usual weekly earnings for 20-24 year old males of $472. This yields a military to civilian pay ratio of 1.04. Throughout the fiscal years in the dataset this rate has ranged from 1.02-1.11.

Additionally, there are five dummy variables that account for the fiscal year in which the reenlistment decision was made. Dummy variables that account for fiscal year could also be utilized in multivariate models to control for economic conditions, as well as other unobservable characteristics for a given fiscal year.

[31] Hosek, and Kavanagh, and Miller, "How Deployments Affect Servicemembers," xix.

5. Demographic Variables

Included in the dataset are four variables that depict a particular Marine's personal characteristics. The married variable is a binary variable that represents whether a Marine is married or not. The variable for number of dependents (number_dependents) is a continuous variable that represents how many dependents a Marine has; these values ranged from 0-10. The male and female variables are dummy variables that indicate the sex of a Marine.

6. Military Occupational Specialty

The original dataset received from the TFDW included a variable for each Marine's MOS. This data was coded to represent dummy variables for each MOS for inclusion in the statistical models. There are 214 dummy variables which represent all of the MOSs. Appendix A is a listing of the title and number of each MOS included in the dataset

C. DESCRIPTIVE STATISTICS

Table 4 lays out the summary statistics for all variables included in the dataset. The mean value for the dependent variable is 0.30, indicating the overall reenlistment rate for the five-year period is right at 30 percent. The mean value (1.16) for SRB multiple offers indicates that across all MOSs an average SRB multiple of just over one was offered. Marines averaged just over one (1.13) deployment in support of Operations Iraqi/Enduring Freedom. Additionally, Marines averaged 166.7 days deployed in support of OIF/OEF. The mean unemployment rate for the five year period was 9.6 percent and the mean military-to-civilian pay ratio was 1.08. The sample is evenly distributed among the five fiscal years with roughly 20 percent from each fiscal year. Nearly 46 percent of the Marines in the dataset are married. The mean number of dependents is .68. Male Marines make up 94 percent of the dataset. The majority of Marines in the dataset are E-4s (59 percent), while E-3s make up 10 percent, E-5s make up 30 percent, and E-6s are less than one percent of the dataset (.002).

Table 4. Summary Statistics for First-Term Marines

Variable	Obs	Mean	Std. Dev.
Dependent Variable			
reenlist	105371	.303537	.4597872
Independent Variables			
srb_multiple	105371	1.157429	1.328291
Total gwot_deployments	105371	1.134325	1.060792
total_gwot~days_deployed	105371	166.7071	163.596
_0_gwot_deployments	105371	.3469645	.4760066
_1_gwot_deployment	105371	.3066214	.461093
_2_gwot_deployments	105371	.2341916	.4234945
_3_or_more_gwot_deployments	105371	.1122225	.3156415
_0_gwot_days_deployed	105371	.3469645	.4760066
_1_to_100_days_deployed	105371	.0555656	.2290819
_101_to_200_days_deployed	105371	.212345	.4089696
_201_to_300_days_deployed	105371	.1591614	.3658283
_301_to_400_days_deployed	105371	.1158763	.320078
more_than_400_days_deployed	105371	.1100872	.3129999
Unemployment_rate	105371	9.614936	.7340741
mil_civ_pay_ratio	105371	1.08487	.0261408
FY03	105371	.1829346	.3866147
FY04	105371	.2137305	.4099407
FY05	105371	.2005201	.4003914
FY06	105371	.2019056	.4014241
FY07	105371	.2009092	.4006822
married	105371	.4560743	.4980692
number_dependents	105371	.684771	.9284723
male	105371	.9385979	.2400675
female	105371	.0614021	.2400675
E3	105371	.1015555	.3020643
E4	105371	.595382	.4908203
E5	105371	.3008228	.458618
E6	105371	.0022397	.0472727

1. Reenlistment Decisions

Reenlistment rates for first-term Marines have fluctuated during the post-9/11 period. Figure 6 describes overall first-term reenlistment rates by fiscal year. These fluctuations in reenlistment rates are hypothesized to be attributed to several factors:

- Prior to the initial deployments to Iraq in fiscal year 2003 many Marines were involuntarily extended to carry out deployments.
- Many Marines joined the Marine Corps to "deploy and fight." The start of OIF could have increased esprit de corps and the desire to be a part of the war.
- The authorized increase in total end-strength to 202,000 Marines.

- A $10,000 reenlistment incentive was given to all Marines, regardless of rank or MOS, reenlisting during fiscal year 2006 and part of 2007.

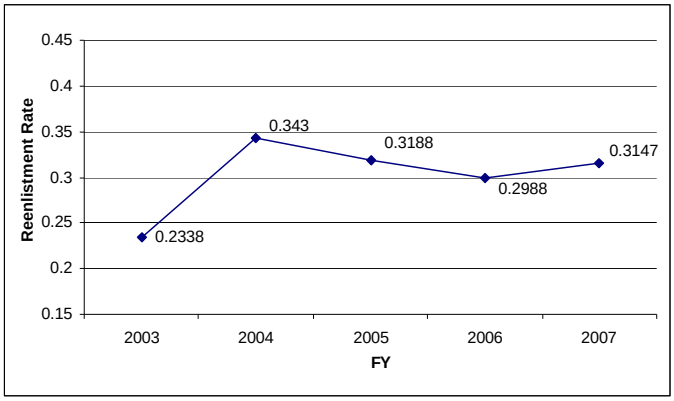

Figure 6. Reenlistment Rates by Fiscal Year

The data shows that reenlistment rates also vary widely by rank. As could be expected, Marines in higher ranks reenlist at considerably higher rates than those in lower ranks. A Marine's motivation and desire for success is hypothesized to have a direct impact on the rank in which he/she attains. A Marine that has a greater taste for "staying Marine" will likely strive to attain higher physical fitness scores, higher proficiency and conduct marks, and higher rifle qualifications, all which contribute to a Marine getting promoted to the next rank. Figure 7 highlights the difference in reenlistment rates for first-term Marines of different ranks. Nearly 90 percent of Marines in the dataset were either E-4 or E-5, only 10 percent were E-3, and less than 1 percent was E-6.

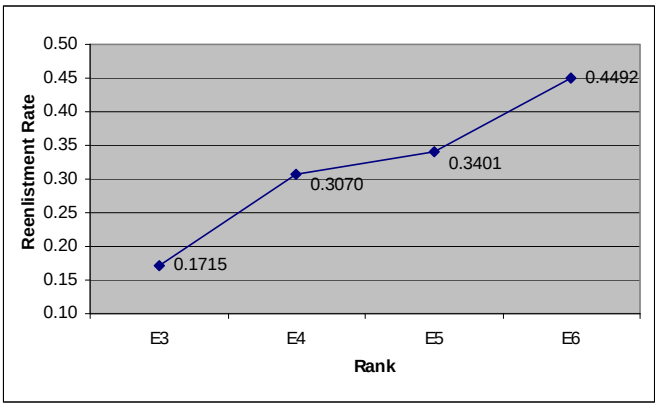

Figure 7. Reenlistment Rates by Rank

2. Selective Reenlistment Bonus Offers

Selective Reenlistment Bonus offers have drastically increased since the onset of the Long War. The average SRB multiple offer for fiscal year 2006 was less than 1.0, whereas by fiscal year 2007 it had risen to nearly 2.0. This increase can be attributed to two factors; the increase in end-strength to 202,000 Marines, and the strain of the increased deployment tempo placed on our Marines. Figure 8 displays the average SRB multiple offers to all first-term Marines for each fiscal year.

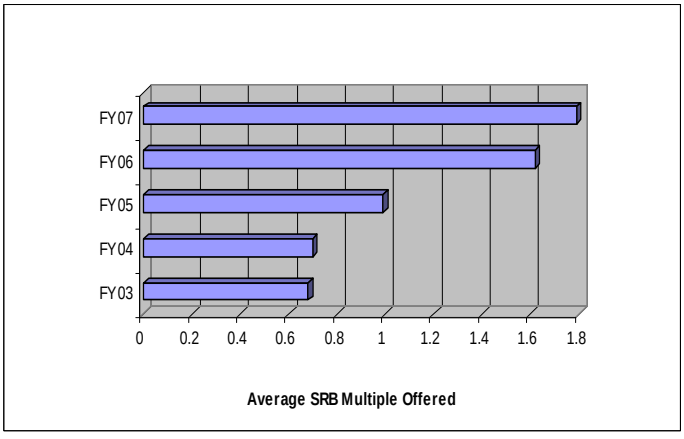

Figure 8. Average SRB Offers by Fiscal Year

3. Marital Status

Most Marines enter the Marine Corps single; however, by the time they make their first reenlistment decision nearly half of them (46 percent) are married. Previous studies have highlighted the fact that married Marines reenlist at higher rates than do their single counterparts.32 This fact holds true for this study as well. Figure 9 highlights the differences in reenlistment rates based on marital status and shows that reenlistment rates for married Marines exceed those of single Marines by 14 percentage points (.37 vs. .23).

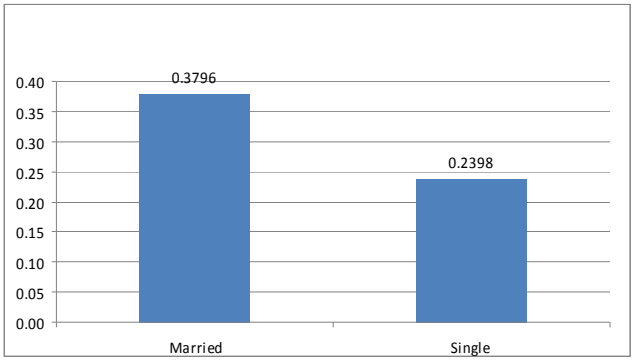

Figure 9. Reenlistment Rates by Marital Status

4. Economic Factors

Economic conditions have seen some variation throughout the time period being analyzed. National unemployment rates for 20-24 year old males have ranged from a high of 11.9 percent in July 2003 to a low of 8 percent in June 2006, with an average rate of 9.6 percent. The military to civilian pay ratio has also seen some variation. This ratio was at a low of 1.04 in 2007 and saw a high of 1.11 in 2006.

32 Hattiangadi, and Shuford, and Quester, "Marine Corps Retention in the Post-9/11 Era: The Effects of Deployment Tempo on Marines With and Without Dependents," 9-14.

5. Deployments to Operation Iraqi/Enduring Freedom

As a result of combat operations in Iraq and Afghanistan, Marines have been deploying more often and for a longer duration. Figure 10 displays the percentage of first-term Marines that deployed at least once in their first-term to either OIF or OEF.

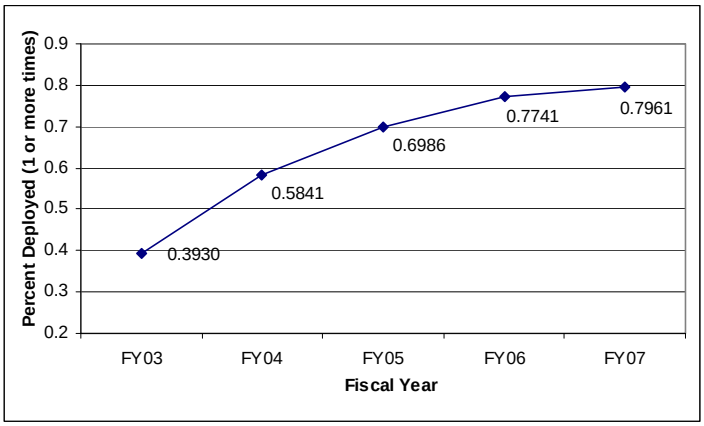

Figure 10. Percent of First-Term Marines Deployed to OIF/OEF

Not only has the sheer number of Marines deploying increased, but also the amount of time, in number of days, a Marine deploys has increased significantly. Figure 11 below shows that the average number of days a Marine deployed to OIF/OEF has risen drastically over time. In fiscal year 2003, the average number of days deployed to OIF/OEF for all first-term Marines in the dataset was 58 days. In contrast, the average days deployed rose to 259 in fiscal year 2007.

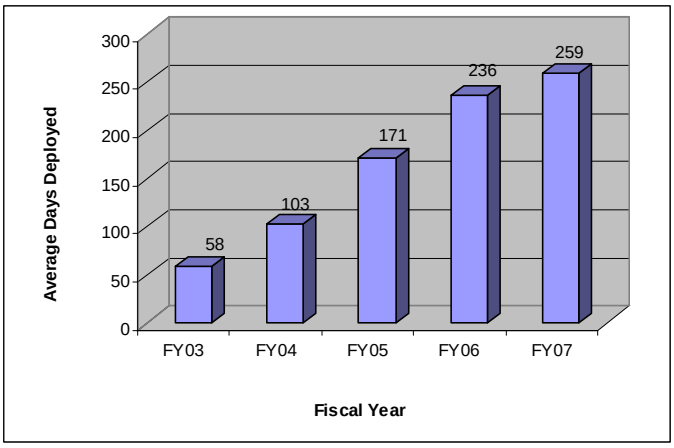

Figure 11. Average Number of Deployed Days by Fiscal Year

Similar to previous studies, this study also finds that single Marines deploy more frequently than do their married counterparts. As shown in Figure 12 below, deployments for single Marines are longer on average by 21.6 days.

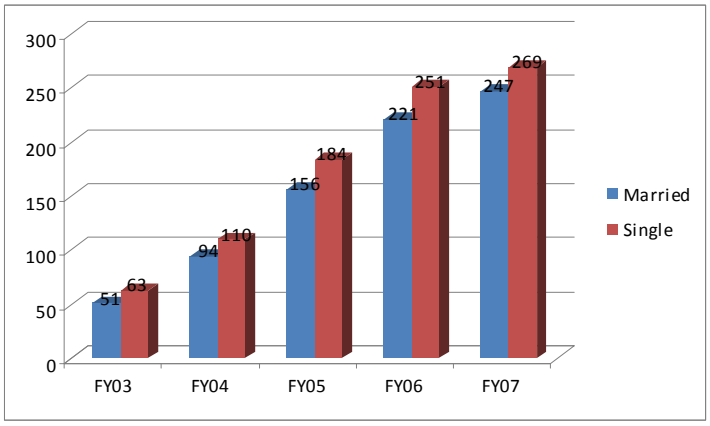

Figure 12. Average Number of Deployed Days by Marital Status and Fiscal Year

Reenlistment rates as a function of deployed days also shows the negative impact of deployment on reenlistment decisions. First-term Marines who did not deploy to Iraq or Afghanistan or spent very little time deployed (1-100 days) have significantly higher reenlistment rates than first-term Marines with more deployed time. Interestingly, reenlistment rates for Marines who deployed 101 days or more are relatively flat as days deployed increases. Figure 13 highlights reenlistment rates as a function of total days deployed in support of OIF/OEF during a Marines initial contract.

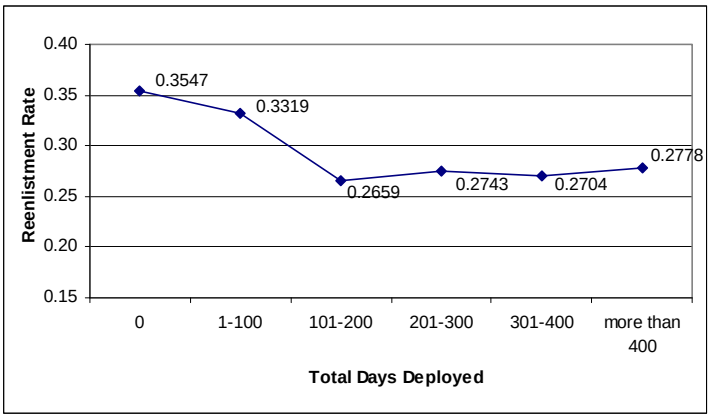

Figure 13. Reenlistment Rates by Number of Days Deployed to OIF/OEF

6. Military Occupational Specialty Reenlistment Rates

Reenlistment rates vary widely among the different Military Occupational Specialties. Table 5 highlights the average reenlistment rate for several high density MOSs and MOSs with exceptionally high or low reenlistment rates over the five-year period.

Table 5. Reenlistment Rates for Selected Military Occupational Specialties

MOS	MOS Title	Reenlistment Rate
High Density MOSs		
0121	Personnel Clerk	0.3780
0151	Administrative Clerk	0.4774
0311	Rifleman	0.2321
0331	Machine Gunner	0.2406
0341	Mortarman	0.2179
3043	Supply Administration and Operations Specialist	0.4182
3051	Warehouse Clerk	0.3429
0621	Field Radio Operator	0.2987
3531	Motor Vehicle Operator	0.3116
5811	Military Police	0.2868
6046	Aircraft Maintenance Administrative Specialist	0.4078
Exceptionally High Reenlistment Rate MOSs		
2336	Explosive Ordnance Disposal (EOD) Technician	0.7778
4066	Small Computer Systems Specialist	0.9357
6232	Fixed Wing Aircraft Flight Mechanic, KC-130	0.7500
6335	Aircraft Electrical Systems Technician	0.9167
Exceptionally Low Reenlistment Rate MOSs		
0622	Digital Wideband Transmission Equipment Operator	0.1856
0626	Fleet SATCOM Terminal Operator	0.0952
5939	Aviation Communications System Technician	0.1818
6214	Unmanned Aerial Vehicle (UAV) Mechanic	0.1591

D. METHODOLOGY

Because of the binary nature of the reenlistment decision, a logistic regression model is specified to estimate the predictive effect of SRBs on the probability of first-term reenlistment by MOS. Due to the model being a prediction model for probabilities, the outcomes need to be limited to between zero and one; therefore, the functional form must be nonlinear.

The Marine Corps is looking for an easily updatable model that can be recreated each fiscal year, if needed. Therefore, the final model specification will only include those independent variables that can be easily obtained or that can be estimated for each year. This study will explore four separate logistic regression models in an attempt to get the true effect of SRB offers on reenlistment decisions. Table 6 displays the variables included in the four logistic regression estimates.

Table 6. Logistic Model Variables

Model #1	**Model #2**	**Model #3**	**Model #4**
reenlist	reenlist	reenlist	reenlist
srb_multiple	srb_multiple	srb_multiple	srb_multiple
_0_gwot_days_deployed	_0_gwot_days_deployed	_0_gwot_days_deployed	-
_1_to_100_gwot_days_deployed	_1_to_100_gwot_days_deployed	_1_to_100_gwot_days_deployed	-
_101_to_200_gwot_days_deployed	_101_to_200_gwot_days_deployed	_101_to_200_gwot_days_deployed	-
_201_to_300_gwot_days_deployed	_201_to_300_gwot_days_deployed	_201_to_300_gwot_days_deployed	-
_301_to_400_gwot_days_deployed	_301_to_400_gwot_days_deployed	_301_to_400_gwot_days_deployed	-
_more_than_400_days_deployed	_more_than_400_days_deployed	_more_than_400_days_deployed	-
FY04	FY04	-	-
FY05	FY05	-	-
FY06	FY06	-	-
FY07	FY07	-	-

-	-	unemployment_rate	unemployment_rate
-	-	mil_civ_pay_ratio	mil_civ_pay_ratio
married	-	-	-
female	-	-	-
E4	-	-	-
E5	-	-	-
E6	-	-	-
mos_*	mos_*	mos_*	mos_*

* - All models will include all 214 dummy variables for MOS as independent variables.

The generic logit model specification is shown in the equation below:

$$LN(P/(1-P)) = \alpha + \beta_1 x_1 ... \beta_k x_k$$

where P is the probability of reenlisting, and LN is the natural logarithm. The estimated coefficients, β_1 through β_k must be converted to obtain the predicted changes in probability given the independent variables x_1 through x_k (called the marginal effect).

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IV. MULTIVARIATE MODEL RESULTS

A. OVERVIEW

This chapter will present the multivariate results for the four logit regression models that estimate the predictive effects of Selective Reenlistment Bonus (SRB) offers on reenlistment. This chapter will present the results for the key independent variables. Appendix B contains the complete logit regression results for all four models. The results of the logit regressions for each model are used to determine the predicted reenlistment rates by Military Occupational Specialty (MOS). Reenlistment rates will be predicted for fiscal year 2008 using each of the four models.

B. MODEL #1: FULLY-SPECIFIED REENLISTMENT MODEL WITH DEPLOYMENT DATA

This model is the most fully-specified of the four logit regression models due to the inclusion of the most explanatory control variables. The dependent variable in this model individual reenlistment decision, measured as a binary variable (yes, no). The explanatory variables include SRB multiple offered, deployment days served, fiscal year dummies, marital status, gender, rank, and dummies for MOS. It is hypothesized that all of the explanatory variables affect whether or not a Marine chooses to reenlist. There are likely many other factors that influence a Marine's decision to reenlist; however, in keeping with the goal of developing a parsimonious, yet accurate, model these characteristics were omitted from the model. The actual model specification is:

$$LN(P/(1-P)) = \alpha + \beta_1 srb\_multiple + \beta_2 1to100gwot\_days\_deployed + \beta_3 101to200gwot\_days\_deployed + \beta_4 201to300gwot\_days\_deployed + \beta_5 301to400gwot\_days\_deployed + \beta_6 more\_than400gwot\_days\_deployed + \beta_7 FY04 + \beta_8 FY05 + \beta_9 FY06 + \beta_{10} FY07 + \beta_{11} married + \beta_{12} female + \beta_{13} E4 + \beta_{14} E5 + \beta_{15} E6 + \sum_i \beta_{16i} mos$$

The results of estimating this model are presented in Table 7. The primary logit coefficient estimates are displayed along with the derivative, or marginal effects, which were calculated at the mean reenlistment rate. Overall, the estimation model fits the data

well. All of the explanatory variables are individually significant, and the large chi-square value (7798.44) indicates joint statistical significance of all variables in the model.

Table 7. Logit Reenlistment Model (#1)

Model 1	Logit Coefficients	Marginal Effects
srb_multiple	0.11600	.0240
	(0.01134)***	
_1_to_100_gwot_days_deployed	-0.09003	-.0186
	(0.03155)***	
_101_to_200_gwot_days_deployed	-0.40787	-.0845
	(0.02015)***	
_201_to_300_gwot_days_deployed	-0.37492	-.0776
	(0.02280)***	
_301_to_400_gwot_days_deployed	-0.40938	-.0848
	(0.02632)***	
more_than_400_gwot_days_deployed	-0.33070	-.0685
	(0.02765)***	
FY04	0.63848	.1322
	(0.02322)***	
FY05	0.55789	.1155
	(0.02444)***	
FY06	0.42581	.0882
	(0.02644)***	
FY07	0.47270	.0979
	(0.02742)***	
married	0.65306	.1353
	(0.01406)***	
female	-0.21988	-.0455
	(0.02941)***	
E4	0.77123	.1597
	(0.02789)***	
E5	0.97482	.2019
	(0.02973)***	
E6	1.27231	.2635
	(0.15563)***	
mos_* (214 Binary Variables)	yes [a]	
Observations	105371	
Constant	-2.659729	
Log Likelihood	-60780.819	
Chi-square	7798.44	
Standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

[a] Coefficients displayed in Appendix B

1. Effects of Selective Reenlistment Bonuses

The effect the SRB multiple on reenlistments is positive and statistically significant. The marginal effect of SRB multiple on reenlistment decisions is 2.4 percentage points, or 8.3 percent. This value indicates that a one-unit increase in the SRB multiple would increase the reenlistment rate by 8.3 percent, holding all other variables constant and at their mean value. At the mean value, this means the reenlistment rate overall would rise from .2905 to .3146 with a one-level increase in the SRB multiple for the Marine Corps as a whole.

2. Effects of Deployment Tempo

The effects of the length of prior deployments on reenlistments are negative and statistically significant, compared to no deployments. Also, the size of the deployment effect increases with the length of deployment. The marginal effects of deployed days on reenlistment decisions ranges from -1.86 percentage points (1-100 days deployed) to -8.48 percentage points (301-400 days deployed), relative to not deploying at all. These values indicate that Marines deploying in support of Operations Iraqi/Enduring Freedom are less likely to reenlist by between 6.4 and 29.2 percent, holding all other variables constant and at their mean values. Thus, a one-level SRB increase would be sufficient to offset the negative reenlistment effect of deploying between 1 and 100 days, but would not be adequate to offset the negative reenlistment effect of longer deployments.

3. Effects of Fiscal Year Controls

Fiscal year dummy variables are included in the model as controls for civilian labor market conditions and other unobservable factors that change over time and that might effect reenlistments. One example would be the $10,000 reenlistment bonus that was given to all Marines during fiscal years 2006 and 2007. It is hypothesized that this bonus would increase reenlistment behavior across the board, thus making the controls for fiscal years important in estimating the independent effect of targeted SRB offers and deployment tempo. All fiscal year dummy variables (2004-2007) are positive and

statistically significant relative to fiscal year 2003. However, the estimated coefficients are larger for fiscal years 2004 and 2005 than for fiscal years 2006 and 2007, as would be expected.

4. Effects of Demographic Variables

The retention effect of being married is positive and statistically significant. The marginal effect of being of married on reenlistment decisions is 13.53 percentage points, or 46.6 percent. This value indicates that being married increases the probability of reenlistment by 46.6 percent, holding all other variables constant and at their mean values. The magnitude of this effect is quite large. The effects of gender are also statistically significant. Female Marines are 4.55 percentage points, or 15.7 percent, less likely to reenlist than males, holding all other variables constant at their mean values.

5. Effects of Rank

The effect of rank on reenlistment decisions is statistically significant. All of the higher ranks (E-4, E-5, and E-6) display positive marginal effects when compared to E-3's. As hypothesized, as a Marine gains more rank, his likelihood of reenlistment increases. This is displayed in the marginal effects of the dummy variables for E-4, E-5, and E6. These values indicate that first-term Marines making reenlistment decisions who are in the grades of E-4, E-5, and E-6 are more likely to reenlist than E-3s by 15.97, 20.19, and 26.35 percentage points, respectively, all else equal. The speed of advancement is an important prediction of retention behavior.

C. MODEL #2: REENLISTMENT MODEL WITH DEPLOYMENT DATA BUT WITHOUT RANK, GENDER, AND MARITAL STATUS

This model is very similar to the first model, except it omits marital status, gender, and rank. These variables are omitted to examine how coefficient of the SRB multiple changes compared to the first model. Omitting these three variables would eliminate potentially unneeded data collection by the Marine Corps SRB Planner.

This model was developed to provide a more simplified version of Model #1, while still controlling for key explanatory variables. The actual model specification is:

$$LN(P/(1-P)) = \alpha + \beta_1 srb\_multiple + \beta_2 1to100 gwot\_days\_deployed + \beta_3 101to200 gwot\_days\_deployed + \beta_4 201to300 gwot\_days\_deployed + \beta_5 301to400 gwot\_days\_deployed + \beta_6 more\_than400 gwot\_days\_deployed + \beta_7 FY04 + \beta_8 FY05 + \beta_9 FY06 + \beta_{10} FY07 + \sum_i \beta_{11i} mos$$

The results of this model specification are presented in Table 8. Displayed are the logit coefficient estimates along with the derivative, or marginal effects, which are calculated at the mean reenlistment rate. As with Model #1, this specification fits the data well and displays overall strong statistical significance as demonstrated by the chi-square value of 4374.18. However, the goodness of fit is not as strong as with Model #1.

Table 8. Logit Reenlistment Model (#2) – Deletes Rank, Gender, and Marital Status

Model #2	Logit Coefficients	Marginal Effects
srb_multiple	0.10571	.0221
	(0.01116)***	
_1_to_100_gwot_days_deployed	-0.06732	-.0141
	(0.03099)**	
_101_to_200_gwot_days_deployed	-0.39180	-.0821
	(0.01975)***	
_201_to_300_gwot_days_deployed	-0.39048	-.0818
	(0.02233)***	
_301_to_400_gwot_days_deployed	-0.41609	-.0872
	(0.02578)***	
more_than_400_gwot_days_deployed	-0.36684	-.0769
	(0.02708)***	
FY04	0.61900	.1297
	(0.02283)***	
FY05	0.53888	.1129
	(0.02401)***	
FY06	0.44807	.0939
	(0.02600)***	
FY07	0.51853	.1086
	(0.02696)***	
mos_* (214 Binary Variables)	yes [a]	
Observations	105371	
Constant	-1.638342	
Log Likelihood	-62492.948	
Chi-square	4374.18	
Standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

[a] Coefficients displayed in Appendix B

1. Effects of the Selective Reenlistment Bonus Multiple

The effect of SRB offers on reenlistments is positive and statistically significant in Model #2. The marginal effect of SRB offers on reenlistment decisions is 2.21 percentage points, or 7.6 percent. The estimation results are very similar to that found in Model #1 (2.4 percentage points), with less than one-half of a percent difference in the marginal effect of a one-unit increase in SRB.

2. Effects of Deployment Tempo

The effect of deployment tempo on reenlistments is negative and statistically significant. The marginal effects of deployed days on reenlistment decisions ranges from -1.41 percentage points (1-100 days deployed) to -8.72 percentage points (301-400 days deployed), relative to not deploying at all. These values indicate that Marines deploying in support of Operations Iraqi/Enduring Freedom anywhere from 4.9 to 30.0 percent less likely to reenlist, holding all other variables constant and at their mean value. As with SRB offers, the marginal effects of deployment tempo for Model #2 are similar to those found in Model #1. The differences in coefficients range from -.0045 (1-100 days deployed) to .0084 (more than 400 days deployed).

3. Effects of Fiscal Year Controls

Similar to Model #1, fiscal year dummy variables were included in Model #2 as controls for economic conditions and other unobservable conditions that might be present from year to year. As was the case in Model #1, all fiscal year dummy variables (2004-2007) are positive and statistically significant relative to fiscal year 2003. However, the coefficient estimates are larger than in Model #1, which is likely due to the omission of marital status, gender, and rank in Model #2.

D. MODEL #3: REENLISTMENT MODEL WITH DEPLOYMENT DATA INCLUDING NATIONAL UNEMPLOYMENT RATE AND MILITARY-CIVILIAN PAY RATIOS

Model #3 utilizes a different approach than in Models #1 or #2. Explanatory variables for the SRB multiple, deployment tempo, and MOS are included; however, fiscal year dummy variables are replaced with variables for the national unemployment rate and the military-to-civilian pay ratio. Both of these variables are measured on an annual basis. The actual model specification is:

$$LN(P/(1-P)) = \alpha + \beta_1 srb\_multiple + \beta_2 1to100 gwot\_days\_deployed + \beta_3 101to200 gwot\_days\_deployed + \beta_4 201to300 gwot\_days\_deployed + \beta_5 301to400 gwot\_days\_deployed + \beta_6 more\_than400 gwot\_days\_deployed + \beta_7 unemploy\_rate + \beta_8 mil\_civ\_pay\_ratio + \sum_i \beta_{9i} mos$$

The results of this model specification are presented in Table 9. Displayed are the logit coefficients along with the derivative, or marginal effects, which are calculated at the mean reenlistment rate. As was the case with the previous two models, this estimation model also fits the data quite well. The chi-square of 3693.37 highlights the strong statistical significance of the overall model.

Table 9. Logit Reenlistment Model (#3) – Including National Unemployment Rate and Military-Civilian Pay Ratio

Model #3	Logit Coefficients	Marginal Effects
srb_multiple	0.10218	.0215
	(0.01109)***	
_1_to_100_gwot_days_deployed	-0.01980	-.0042
	(0.03079)	
_101_to_200_gwot_days_deployed	-0.34408	-.0722
	(0.01956)***	
_201_to_300_gwot_days_deployed	-0.33910	-.0712
	(0.02221)***	
_301_to_400_gwot_days_deployed	-0.37575	-.0789
	(0.02572)***	
more_than_400_gwot_days_deployed	-0.33166	-.0696
	(0.02703)***	
unemployment_rate	-0.09238	-.0194
	(0.01193)***	
mil_civ_pay_ratio	2.53602	.5325
	(0.26340)***	
mos_* (214 Binary Variables)	yes [a]	
Observations	105371	
Constant	-3.090534	
Log Likelihood	-62833.353	
Chi-square	3693.37	
Standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

[a] Coefficients displayed in Appendix B

1. Effects of the Selective Reenlistment Bonus Multiple

The effect of the SRB multiple on reenlistments is positive and statistically significant. The marginal effect of SRB on reenlistment decisions is 2.15 percentage

points, or 7.4 percent. The magnitude of the SRB effect is very similar to those found in the two previous models, with less than a one percent difference in the size of the marginal effect.

2. Effects of Deployment Tempo

The effect of deployment tempo on reenlistments is negative and statistically significant for all deployment variables. The lone exception is the coefficient for deployments of 1-100 days, which is insignificant. The marginal effects of deployed days on reenlistment decisions ranges from -.42 percentage points (1-100 days deployed) to -7.89 percentage points (301-400 days deployed), relative to not deploying at all. These values indicate that Marines deploying in support of Operations Iraqi/Enduring Freedom are less likely to reenlist by anywhere from 1.5 to 27.2 percent, holding all other variables constant and at their mean value. However, the (1-100 days deployed) variable is not statistically significant at any acceptable level.

3. Effects of Economic Variables

The effect of national-level unemployment rates for 20 to24-year old males on reenlistment is negative and statistically significant. The marginal effect of unemployment rates on reenlistment decisions is 1.94 percentage points, indicating a 1 percentage point increase in national unemployment rates decreases reenlistments by 1.94 percentage points, holding all other variables constant at their mean value. This finding is not consistent with previous studies of reenlistment, nor with economic theory. Several previous studies have found that higher unemployment rates are associated with higher reenlistment rates.[33] One possible explanation for the negative effect is that it is due to the lack of variation in the national level unemployment rate for 20 to 24-year-old males during the time period analyzed. Another explanation is that the national unemployment rate is not a good proxy for the actual unemployment, perhaps at the local level, that affects individuals' reenlistment decision.

[33] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 31.

The effect of military pay relative to civilian pay on reenlistments is positive and statistically significant, as expected. The marginal effect of the military-to-civilian pay ratio is .53 percentage points, indicating that a one percentage point increase in the military-to- civilian pay ratio results in a .53 percentage point increase in reenlistments. This finding is in line with previous studies that have found that higher levels of relative military pay lead to higher reenlistments.[34]

E. MODEL #4: REENLISTMENT MODEL WITHOUT DEPLOYMENT VARIABLES

Model #4 was created to analyze the predictive ability of a model that omits controls for prior deployment tempo. Model #4 mirrors the specification in Model #3 with the exception of the omission of controls for deployment tempo. The estimated effects of the Selective Reenlistment Bonus multiple will be compared to those in Model #3 to assess the need for incorporating deployment data in the overall model. The actual model specification is:

$$LN(P/(1-P)) = \alpha + \beta_1 srb\_multiple + \beta_2 unemploy\_rate + \beta_3 mil\_civ\_pay\_ratio + \sum_i \beta_{4i} mos$$

The results of estimating Model #4 are presented in Table 10. Displayed are the logit coefficients along with the derivatives, or marginal effects, which were calculated at the mean reenlistment rate. Similar to the previous three models, this estimation model seems to fit the data well, indicated by the chi-square value of 3199.18.

[34] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 31.

Table 10. Logit Reenlistment Model (#4) – Omitting Deployment Tempo

Model #4	Logit Coefficients	Marginal Effects
	Reenlist	
srb_multiple	0.09624	.0202
	(0.01100)***	
unemployment_rate	-0.02401	-.0051
	(0.01103)**	
mil_civ_pay_ratio	2.14039	.4501
	(0.26152)***	
mos_* (214 Binary Variables)	yes [a]	
Observations	105371	
Constant	-3.551835	
Log Likelihood	-63080.446	
Chi-square	3199.18	
Standard errors in parentheses		
* significant at 10%; ** significant at 5%; *** significant at 1%		

[a] Coefficients displayed in Appendix B

1. Effects of the Selective Reenlistment Bonus Multiple

As with Model #3, the effects of the SRB multiple is positive and statistically significant. The marginal effect of the SRB multiple on reenlistment decisions is 2.02 percentage points, or 6.95 percent. This effect is considerably smaller than those found in previous studies.[35] The North study found that the marginal effect of SRB offers on reenlistment decisions was 7.1 percentage points, or 27.6 percent. In comparison to Model #3, the SRB marginal effect is .13 percentage points, or .45 percent, lower. This indicates that for a one-unit increase in SRB offers the reenlistment rate would be .45 percent lower using Model #4 vice Model #3, holding all other variables constant at their mean value. This difference may seem small, but it is highly significant. When using models #3 and #4 to predict reenlistment rates for a given MOS, the predicted reenlistment rates vary by 1 to 9 percent, depending on MOS and SRB multiple. For

[35] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 28.

example, the predicted reenlistment rates for Ammunition Technicians (MOS 2311) at an SRB multiple of 4 is 39 percent under Model #3 and 42 percent under Model #4. Using the model that omits deployment data could over-predict reenlistment rates and under-retain Marines to the desired manning levels. There is a clear difference in models when deployment tempo is included in the estimation model.

2. Effects of Economic Variables

The effect of the 20-24 year old male national-level unemployment rate on reenlistment continues to be negative, which is inconsistent with previous literature. The marginal effect of unemployment rates on reenlistment decisions is -.005 percentage points, which is consistent with the results found in Model #3. The effect of military pay relative to civilian pay on reenlistments is positive and statistically significant. The marginal effect of the military-to-civilian pay ratio is .45 percentage points, indicating that a one percentage point increase in the ratio results in a .45 percentage point increase in reenlistments. This result is similar to that found in Model #3. Previous studies of reenlistment found the marginal effect of military-to-civilian pay to be .20 percentage points.[36]

F. PREDICTION MODEL

The results from the four logit models are used to predict the probability of reenlistment by Military Occupational Specialty for fiscal year 2008. The predicted reenlistment probabilities are constructed using the logit coefficients and some basic assumptions about values of the explanatory variables for fiscal year 2008. Predicted reenlistment rates for fiscal year 2008 for several high density MOSs are presented in Table 11. A comprehensive listing of predicted reenlistment rates for all MOSs is contained in Appendix C. Additionally, four separate Microsoft Excel spreadsheets are developed to assist manpower planners to calculate predicted reenlistment rates. Screenshots from each of these models are contained in Appendix D.

[36] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 31.

Table 11. Predicted Fiscal Year 2008 Reenlistment Rates for High-Density MOSs

	SRB Multiple of 0 Model #				SRB Multiple of 1 Model #				SRB Multiple of 2 Model #				SRB Multiple of 3 Model #				SRB Multiple of 4 Model #				SRB Multiple of 5 Model #			
MOS	***1***	***2***	***3***	***4***	***1***	***2***	***3***	***4***	***1***	***2***	***3***	***4***	***1***	***2***	***3***	***4***	***1***	***2***	***3***	***4***	***1***	***2***	***3***	***4***
0121	0.35	0.35	0.31	0.36	0.38	0.37	0.33	0.39	0.40	0.40	0.36	0.41	0.43	0.42	0.38	0.43	0.46	0.45	0.41	0.46	0.49	0.48	0.43	0.48
0151	0.46	0.45	0.41	0.46	0.49	0.48	0.43	0.49	0.52	0.50	0.46	0.51	0.55	0.53	0.48	0.54	0.57	0.56	0.51	0.56	0.60	0.58	0.54	0.58
0311	0.20	0.19	0.17	0.18	0.21	0.21	0.18	0.19	0.24	0.23	0.20	0.21	0.26	0.25	0.21	0.23	0.28	0.27	0.23	0.24	0.30	0.29	0.25	0.26
0331	0.20	0.20	0.18	0.19	0.22	0.22	0.19	0.20	0.24	0.24	0.21	0.22	0.26	0.26	0.22	0.24	0.28	0.28	0.24	0.25	0.31	0.30	0.26	0.27
0341	0.18	0.18	0.16	0.17	0.20	0.20	0.17	0.18	0.22	0.22	0.19	0.20	0.24	0.24	0.20	0.21	0.26	0.26	0.22	0.23	0.28	0.28	0.24	0.25
0621	0.27	0.28	0.25	0.27	0.30	0.30	0.27	0.28	0.32	0.33	0.29	0.30	0.35	0.35	0.31	0.33	0.37	0.38	0.33	0.35	0.40	0.40	0.36	0.37
3043	0.41	0.41	0.37	0.40	0.44	0.43	0.39	0.43	0.47	0.46	0.42	0.45	0.49	0.49	0.44	0.48	0.52	0.51	0.47	0.50	0.55	0.54	0.49	0.52
3051	0.35	0.34	0.30	0.33	0.37	0.36	0.32	0.35	0.40	0.39	0.34	0.37	0.43	0.41	0.37	0.40	0.46	0.44	0.39	0.42	0.49	0.47	0.42	0.44
3531	0.30	0.31	0.27	0.30	0.33	0.34	0.30	0.32	0.35	0.36	0.32	0.34	0.38	0.38	0.34	0.36	0.41	0.41	0.36	0.38	0.44	0.43	0.39	0.41
5811	0.24	0.25	0.22	0.26	0.27	0.28	0.24	0.28	0.29	0.30	0.26	0.30	0.31	0.32	0.28	0.32	0.34	0.34	0.30	0.34	0.37	0.37	0.32	0.36
6046	0.36	0.38	0.34	0.37	0.38	0.40	0.36	0.40	0.41	0.43	0.38	0.42	0.44	0.45	0.41	0.44	0.47	0.48	0.43	0.47	0.50	0.51	0.46	0.49

1. Model #1 and Model #2 Assumptions

In developing the predicted reenlistment rates by MOS, several assumptions are made for the independent variables. It is hypothesized that fiscal year 2008 would be more like fiscal year 2007 than any other fiscal year in the sample. For this reason, and due to lack of availability of data for fiscal year 2008, the average values for fiscal year 2007 for deployed days, percent married, percent female, and rank distribution were used to calculate the predicted reenlistment rates for fiscal year 2008. The difference between Model #1 and Model #2 is that married, female, and rank are omitted in model #2. Appendix D contains several screenshots from the Microsoft Excel Models which demonstrates these assumptions.

2. Model #3 and Model #4 Assumptions

Similar assumptions to those made for Models #1 and #2 are made in constructing the predicted reenlistment rates for Models #3 and #4. Average deployment days for fiscal year 2007 are utilized in the prediction models. However, actual unemployment rates for 2008 and military-to-civilian pay ratios for 20-24 year old males at the national level are used.[37] This data was obtained from the Bureau of Labor Statistics. Appendix D contains several screenshots from the Microsoft Excel Model which demonstrate these assumptions.

3. Fiscal Year 2008 Prediction Results

The predicted fiscal year 2008 reenlistment rates for several high density MOSs are contained in Table 11. For each of the MOSs, the model specifications in columns 1-4 clearly change the predicted reenlistment rate. For example, MOS 0311 (rifleman) would have a predicted reenlistment rate of .26 with an SRB multiple of 3.0 under model

[37] The Bureau of Labor Statistics, "Searchable Database," https://data.bls.gov (accessed 20 October 2008).

#1 compared to a rate of .23 for model #4 with the same SRB multiple. These results are comparable with previous studies.[38] The North study predicted reenlistment rates for the Infantry occupational field to be .268 for a SRB multiple of 3.0.

G. CHAPTER SUMMARY

This chapter has presented the multivariate results for the four logit regression models developed to estimate the predictive effects of Selective Reenlistment Bonus offers on reenlistment decisions. It also developed and presented predicted reenlistment rates for fiscal year 2008 based on the four logit model specifications. The results clearly show that SRB offers are a positive and statistically significant indicator of increased reenlistments. Additionally, the results show that deployments to Operations Iraqi/Enduring Freedom have a negative and statistically significant effect on reenlistment decisions, thus should be included in any model that attempts to predict reenlistment decisions.

[38] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 34-35.

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V. VALIDATION AND SENSITIVITY ANALYSIS

A. OVERVIEW

This chapter will validate the results of the multivariate logit models in Chapter IV. The validation is done by estimating the logit reenlistment model using data for fiscal years 2003 through 2006. The coefficients from this model are then used to predict reenlistment rates by Military Occupational Specialty for fiscal year 2007 (which is the "hold out" sample). The predicted rates for 2007 are then compared to the actual fiscal year 2007 reenlistment rates and the percent prediction error is calculated. Model #1 from Chapter IV of this thesis was chosen to conduct the validation because it displayed the highest predictive ability compared to the other three models.

B. VALIDATION REENLISTMENT MODEL

Model #1 was chosen for the validation exercise because it is the most fully specified of the four logit regression models. The only difference between the validation model and Model #1 from Chapter IV is that the validation model was estimated using data for fiscal years 2003 through 2006 rather than the full data set for fiscal years 2003 through 2007. Fiscal year 2007 data constitutes the "hold out" sample. Deleting observations for 2007 reduced the total observations to 84,191. The dependent variable in this model is the binary reenlistment variable. The explanatory variables include SRB multiple offered, deployment days, and dummies for fiscal year, marital status, gender, rank, and MOS. As with Model #1 from Chapter IV, it is hypothesized that all of the explanatory variables affect whether or not a Marine chooses to reenlist. The actual model specification is:

$$LN(P/(1-P)) = \alpha + \beta_1 srb\_multiple + \beta_2 1to100 gwot\_days\_deployed + \beta_3 101to200 gwot\_days\_deployed + \beta_4 201to300 gwot\_days\_deployed + \beta_5 301to400 gwot\_days\_deployed + \beta_6 more\_than400 gwot\_days\_deployed + \beta_7 FY04 + \beta_8 FY05 + \beta_9 FY06 + \beta_{10} married + \beta_{11} female + \beta_{12} E4 + \beta_{13} E5 + \beta_{14} E6 + \sum_i \beta_{15i} mos$$

The results of estimating the model (using data for 2003-2006) are presented in Table 12. The primary logit coefficient estimates are displayed. Overall, the estimation model fits the data well indicated by the large chi-square value of 6,909.58. Complete model results are contained in Appendix E. The results from the validation model are similar to the Model #1, which included fiscal year 2007 data. All coefficient estimates are similar, in both direction and magnitude. As expected, because of more observations, the chi-square value for Model #1 is larger than the validation model, 7798.44 vice 6909.58. This model will be utilized to predict fiscal year 2007 reenlistment rates by MOS in order to determine the predictive accuracy and usability of the models in Chapter IV.

Table 12. Logit Validation Reenlistment Model, Estimated Using Data for FY 2003-2006

Validation Model	Logit Coefficients
srb_multiple	0.14790
	(0.01293)***
_1_to_100_gwot_days_deployed	-0.18529
	(0.03333)***
_101_to_200_gwot_days_deployed	-0.50001
	(0.02179)***
_201_to_300_gwot_days_deployed	-0.45482
	(0.02583)***
_301_to_400_gwot_days_deployed	-0.51607
	(0.03126)***
more_than_400_gwot_days_deployed	-0.46551
	(0.03557)***
FY04	0.66074
	(0.02336)***
FY05	0.58583
	(0.02481)***
FY06	0.44755
	(0.02752)***
Married	0.63907
	(0.01585)***
Female	-0.28433
	(0.03321)***
E4	0.78703
	(0.03087)***
E5	1.01970

	(0.03304)***
E6	1.24511
	(0.16554)***
mos_* (214 Binary Variables)	yes [a]
Observations	84,191
Constant	-2.66767
Log Likelihood	-48,027.501
Chi-square	6,909.58
Standard errors in parentheses	
* significant at 10%; ** significant at 5%; *** significant at 1%	

[a] Coefficients displayed in Appendix E

C. FISCAL YEAR 2007 PREDICTION RESULTS

1. Predictions Using USMC-Wide Mean FY07 Values for the Explanatory Variables

The first of the two methods utilized to predict fiscal year 2007 reenlistment by MOS is done by using the coefficient estimates from the validation reenlistment model and the average values for the explanatory variables for the entire Marine Corps. These average values were easily computed since the original dataset contained detailed information on those Marines reenlisting in fiscal year 2007. The reenlistment prediction for each MOS is calculated using the results from validation logit model. Each MOS prediction was calculated in the following manner. In the equation below the example of MOS 0341 is used. The calculation yields a predicted reenlistment probability of 26 percent for fiscal year 2007. Specifically, the predicted reenlistment probability (P) is computed from:

$$P = 1/1 + \exp(\text{logit}),$$

where,

$$\begin{aligned} Logit &= (-2.66767(1)) + (.1479(4)) + (-.18529(.0217)) + (-.50(.1305)) + (-.4548(.1981)) \\ &+ (-.5161(.1931)) + (-.4655(.2527)) + (.6607(0)) + (.5858(0) + (.4475(1)) + (.6391(.4693)) \\ &+ (-.2843(.06)) + (.7870(.5838)) + (1.097(.33)) + (1.24511(.0014) + (-.1247(1)) \\ &= .26 \end{aligned}$$

Table 13 describes the mean values used for each explanatory variable ($\bar{X}$), and the logit coefficients (β) used to determine the predicted reenlistment probability, P (as in the equation above).

Table 13. Prediction Values Used in USMC Average Predictions for MOS 0341

Variable	Logit Coefficient (β)	Value Used ($\bar{X}$)
Constant	-2.6676	1 in all models
SRB Multiple	.1479	Actual SRB offered in FY07 for each MOS (4.0 for MOS 0341 in the example)
1-100 days deployed	-.18529	USMC wide average for FY07 (.02168 for all MOS predictions)
101-200 days deployed	-.500	USMC wide average for FY07 (.1305 for all MOS predictions)
201-300 days deployed	-.4548	USMC wide average for FY07 (.1981 for all MOS predictions)
301-400 days deployed	-.5161	USMC wide average for FY07 (.1931 for all MOS predictions)
>400 days deployed	-.4655	USMC wide average for FY07 (.2527 for all MOS predictions)
FY06	.4475	1 For all MOS Predictions (FY07 is more like FY06 than any other FY in the sample[39]
Married	.63907	USMC wide average for FY07 (.469296 for all MOS predictions)

[39] An alternative method often used in forecasting models is to include a time-series variable that captures changes over time. This method would have assigned a sequential numeric value for each FY in the sample (1 for FY03, 2 for FY04, etc.). The prediction estimation would then be computed using the next sequential number (6 for FY07 in the MOS 0341 example).

Female	-.28433	USMC wide average for FY07 (.060 for all MOS predictions)
E4	.787	USMC wide average for FY07 (.5838 for all MOS predictions)
E5	1.0197	USMC wide average for FY07 (.33 for all MOS predictions)
E6	1.24511	USMC wide average for FY07 (.001 for all MOS predictions)
MOS dummies	-.1247 (for 0341) varies by MOS	=1 for the MOS being predicted; 0 for all others

The results from the predictions are only moderately accurate. The average percent error for all MOSs in the sample is .32.

The average percent error is derived using the following formula:

Average Percent Error = ((predicted reenlistment rate – actual reenlistment rate) / (actual reenlistment rate))

Appendix F contains the predicted reenlistment rates for all MOSs compared to the actual fiscal year 2007 reenlistment rate.

Because many MOSs have a small sample size, a second method for assessing predictive accuracy is to examine only high-density MOSs. There are 27 MOSs that this thesis defines as high-density MOSs. These 27 MOSs make up 60.57 percent of Marines making first term reenlistment decisions in fiscal year 2007. Additionally, individually, each of the 27 MOSs makes up at least 1 percent of the total sample. When examining the predictive ability of the model using these 27 MOSs, the predictions are much more accurate based on the prediction error. Table 15 displays the prediction results and percent prediction error for these high-density MOSs. The overall average percent error is reduced to .149, and 9 of the 27 MOSs predictions are within .10 of the actual fiscal year 2007 reenlistment rate.

2. Predictions Using Mean Values for X for Each MOS

The second technique in predicting fiscal year 2007 reenlistments utilizes individual MOS characteristics of the explanatory variables. The second of the two methods utilized to predict fiscal year 2007 reenlistment by MOS is done by using the coefficients from the validation reenlistment model but using individual MOS mean values for the explanatory variables rather than USMC-wide means. The hypothesis is that individual MOSs characteristics are different from one another. For example, it is known that there are no female Marines in MOS 0341 and that certain MOS deploy more heavily than others. The reenlistment prediction for each MOS is calculated using the coefficients from the validation model. The following equation shows the calculation method of the predicted reenlistment rate for MOS 0341 for FY 2007, which is .23.

$$P = 1/1 + \exp(\text{logit}),$$

where,

$$\begin{aligned} Logit &= (-2.66767(1)) + (.1479(4)) + (-.18529(.0122)) + (-.50(.0472)) + (-.4548(.1801)) \\ &+ (-.5161(.3199)) + (-.4655(.4143)) + (.6607(0)) + (.5858(0) + (.4475(1)) + (.6391(.4580)) \\ &+ (-.2843(0)) + (.7870(.6818)) + (1.097(.1975)) + (1.24511(0) + (-.1247(1)) \\ &= .23 \end{aligned}$$

Table 14 describes the values of the coefficient (β) and the explanatory variable ($\bar{X}$) used to estimate the predicted reenlistment probability for MOS 0341.

Table 14. Prediction Values Used in MOS Average Predictions for MOS 0341

Variable	Logit Coefficient (β)	Value Used ($\bar{X}$)
Constant	-2.6676	1 in all models
SRB Multiple	.1479	Actual SRB offered in FY07 for each MOS (4.0 for MOS 0341 in the example)
1-100 days deployed	-.18529	Individual MOS average for FY07 (.0122 for 0341 in the example)

101-200 days deployed	-.500	Individual MOS average for FY07 (.0472 for 0341 in the example)
201-300 days deployed	-.4548	Individual MOS average for FY07 (.1801 for 0341 in the example)
301-400 days deployed	-.5161	Individual MOS average for FY07 (.3199 for 0341 in the example)
>400 days deployed	-.4655	Individual MOS average for FY07 (.4133 for 0341 in the example)
FY06	.4475	1 For all MOS Predictions (FY07 is more like FY06 than any other FY in the sample
Married	.63907	Individual MOS average for FY07 (.4580 for 0341 in the example)
Female	-.28433	Individual MOS average for FY07 (0 for 0341 in the example)
E4	.787	Individual MOS average for FY07 (.6818 for 0341 in the example)
E5	1.0197	Individual MOS average for FY07 (.1975 for 0341 in the example)

E6	1.24511	Individual MOS average for FY07 (0 for 0341 in the example)
MOS dummies	-.1247 (0341) varies by MOS	1 for the MOS being predicted; 0 for all others

The predictive accuracy of this method is better than the first method. The average percent prediction error for the 27 high-density MOSs is reduced from .147 in the first method to .12. In the example for MOS 0341 the first method predicted a .26 reenlistment rate, while the second method predicted a .23 reenlistment rate. The actual reenlistment rate for MOS 0341 in 2007 was .23, making the second method a more accurate predictor (zero prediction error). However, 7 of the 27 MOSs were predicted more accurately using the first method. Overall, the second method appears to be a better predictor, at least for the 27 high-density MOSs. However, the second method is far more labor intensive, because the planner must calculate and input the mean of the explanatory variables for each MOS.

The prediction estimates from the two methods are presented in Tables 15 and 16. Displayed are the predicted reenlistment rate and actual reenlistment rate for the 27 high-density MOSs selected. Additionally, the table presents the percent prediction error for both methods. MOSs that are under-predicted (predicted reenlistment rate is lower than the actual reenlistment rate) are displayed with parentheses and are highlighted. Those MOSs that were over-predicted (predicted reenlistment rate is higher than the actual reenlistment rate) are displayed without parentheses and are not highlighted. Also, the average percent error for each of the two methods is displayed. The average percent error is calculated from the absolute value of the prediction error for each of the 27 MOSs.

Table 15. Fiscal Year 2007 Predicted Reenlistment Rates (Selected MOSs) Using USMC-Wide Values for the Explanatory Variables

FY07 Predictions Using FY07 USMC Mean Values for the x's			
MOS	Predicted Reenlist Rate	Actual 07 Reenlist Rate	Percent Error
mos_0121	0.32	0.44	(0.27)
mos_0151	0.44	0.48	(0.08)
mos_0311	0.28	0.24	0.19
mos_0331	0.29	0.24	0.18
mos_0341	0.26	0.23	0.11
mos_0351	0.28	0.21	0.33
mos_0621	0.27	0.33	(0.19)
mos_0651	0.18	0.26	(0.31)
mos_0656	0.18	0.26	(0.33)
mos_0811	0.29	0.29	0.01
mos_1341	0.25	0.28	(0.12)
mos_1345	0.24	0.25	(0.04)
mos_1371	0.29	0.25	0.15
mos_1391	0.28	0.24	0.15
mos_1833	0.33	0.25	0.34
mos_2311	0.34	0.33	0.05
mos_3043	0.40	0.41	(0.02)
mos_3051	0.32	0.38	(0.14)
mos_3381	0.30	0.36	(0.16)
mos_3521	0.30	0.31	(0.02)
mos_3531	0.30	0.32	(0.05)
mos_3533	0.24	0.29	(0.15)
mos_5811	0.25	0.29	(0.13)
mos_6046	0.36	0.44	(0.18)
mos_6531	0.33	0.35	(0.05)
mos_6672	0.43	0.53	(0.19)
mos_7051	0.24	0.23	0.05
		Average Percent Error	14.79%

Table 16. Fiscal Year 2007 Predicted Reenlistment Rates (Selected MOSs) Using Individual MOS Mean Values for the Explanatory Variables

FY07 Predictions Using FY07 MOS Mean Values for the x's			
MOS	Predicted Reenlist Rate	Actual 07 Reenlist Rate	Percent Error
mos_0121	0.36	0.44	(0.18)
mos_0151	0.47	0.48	(0.02)
mos_0311	0.25	0.24	0.04
mos_0331	0.26	0.24	0.07
mos_0341	0.23	0.23	(0.00)
mos_0351	0.24	0.21	0.14
mos_0621	0.26	0.33	(0.21)
mos_0651	0.20	0.26	(0.23)
mos_0656	0.18	0.26	(0.31)
mos_0811	0.28	0.29	(0.03)
mos_1341	0.24	0.28	(0.14)
mos_1345	0.23	0.25	(0.07)
mos_1371	0.29	0.25	0.13
mos_1391	0.27	0.24	0.13
mos_1833	0.32	0.25	0.30
mos_2311	0.34	0.33	0.04
mos_3043	0.42	0.41	0.03
mos_3051	0.31	0.38	(0.16)
mos_3381	0.29	0.36	(0.18)
mos_3521	0.32	0.31	0.04
mos_3531	0.31	0.32	(0.04)
mos_3533	0.22	0.29	(0.23)
mos_5811	0.27	0.29	(0.08)
mos_6046	0.39	0.44	(0.12)
mos_6531	0.33	0.35	(0.06)
mos_6672	0.45	0.53	(0.13)
mos_7051	0.26	0.23	0.14
		Average Percent Error	12.00%

D. VALIDATION REENLISTMENT MODEL – OMITS DEPLOYMENT VARIABLES

To further assess the usefulness of incorporating deployment variables into the prediction model, a separate validation model was estimated (using data for FY03-FY06) which mirrors the initial validation model, except it omits the deployment tempo variables. The actual model specification is:

$$LN(P/(1-P)) = \alpha + \beta_1 srb\_multiple + \beta_2 FY04 + \beta_3 FY05 + \beta_4 FY06 + \beta_5 married + \beta_6 female + \beta_7 E4 + \beta_8 E5 + \beta_9 E6 + \sum_i \beta_{10i} mos$$

Results of this model specification are listed in Table 17. Appendix G contains the complete results.

Table 17. Logit Validation Model – No Deployment Variables (Data for FY03-FY06)

Validation Model – No Deployment Tempo	Logit Coeeficients
srb_multiple	0.14234
	(0.01278)***
FY04	0.57164
	(0.02296)***
FY05	0.43219
	(0.02369)***
FY06	0.25996
	(0.02559)***
married	0.64446
	(0.01575)***
female	-0.18757
	(0.03282)***
E4	0.78044
	(0.03076)***
E5	1.02273
	(0.03293)***
E6	1.32367
	(0.16440)***
mos_* (214 Binary Variables)	yes [a]
Observations	84191
Constant	-2.87832
Log Likelihood	48385.01
Chi-square	6194.56
Standard errors in parentheses	
* significant at 10%; ** significant at 5%; *** significant at 1%	

[a] Coefficients displayed in Appendix G

1. Predictions for FY07 Omitting Deployment Variables

The results from the validation model that omits variables for deployment tempo are then used to predict fiscal year 2007 MOS reenlistment rates in the same manner as in paragraphs C.1 and C.2 of this chapter—one using overall Marine Corps-wide mean values for the explanatory variables and the other using mean values for the explanatory variables for each MOS. Tables 18 and 19 display the prediction results for the same 27 high-density MOSs as in the previous two methods.

Table 18. Fiscal Year 2007 Predicted Reenlistment Rates (Selected MOSs) — Omitting Deployment Tempo Variables Using USMC-Wide Mean Values for the Explanatory Variables

FY07 Predictions Using FY07 Mean and no deployments		
Predicted Reenlist Rate	***Actual 07 Reenlist Rate***	***Percent Error***
0.36	0.44	(0.19)
0.48	0.48	0.00
0.28	0.24	0.16
0.28	0.24	0.14
0.25	0.23	0.07
0.27	0.21	0.30
0.27	0.33	(0.20)
0.19	0.26	(0.25)
0.19	0.26	(0.29)
0.28	0.29	(0.02)
0.25	0.28	(0.11)
0.24	0.25	(0.07)
0.28	0.25	0.11
0.28	0.24	0.14
0.32	0.25	0.27
0.35	0.33	0.06
0.41	0.41	0.02
0.33	0.38	(0.11)
0.31	0.36	(0.14)
0.30	0.31	(0.03)
0.31	0.32	(0.04)
0.24	0.29	(0.18)
0.27	0.29	(0.05)
0.37	0.44	(0.15)
0.34	0.35	(0.03)
0.45	0.53	(0.14)
0.26	0.23	0.15
	Average Percent Error	**12.70%**

Table 19. Fiscal Year 2007 Predicted Reenlistment Rates (Selected MOSs) — Omitting Deployment Tempo Variables Using Individual MOS Mean Values for the Explanatory Variables

FY07 Predictions Using FY07 MOS Mean and no deployments			
Predicted Reenlist Rate	***Actual 07 Reenlist Rate***		***Percent Error***
0.35	0.44		(0.20)
0.46	0.48		(0.03)
0.25	0.24		0.05
0.27	0.24		0.09
0.24	0.23		0.03
0.24	0.21		0.18
0.27	0.33		(0.18)
0.20	0.26		(0.23)
0.19	0.26		(0.28)
0.28	0.29		(0.01)
0.25	0.28		(0.12)
0.24	0.25		(0.05)
0.29	0.25		0.15
0.28	0.24		0.15
0.32	0.25		0.29
0.34	0.33		0.03
0.42	0.41		0.04
0.32	0.38		(0.14)
0.31	0.36		(0.15)
0.32	0.31		0.05
0.32	0.32		(0.02)
0.22	0.29		(0.22)
0.27	0.29		(0.07)
0.39	0.44		(0.12)
0.34	0.35		(0.02)
0.46	0.53		(0.12)
0.26	0.23		0.15
	Average Percent Error		**11.75%**

Based on the overall average percent error, the results from this method appear to be more accurate than from the validation model that includes deployment tempo variables. However, the difference is small, especially for the prediction method that utilizes individual MOS mean values for the explanatory variables (Table 19). The overall average percent error is only 0.25 smaller when comparing the models without and with deployment variables, (.1175 vice .1200). Additionally, the prediction error varies by individual MOS. For example, when using Marine Corps-wide means for the explanatory variables, MOS 7051 is predicted with greater accuracy using the model that incorporates deployment variables (.05 percent error vice .15 percent error); however, MOS 0151 is predicted with greater accuracy utilizing the model that omits deployment variables (.00 percent error vice .08 percent error). It is clear that the accuracy of the prediction not only depends on the model, but also on the individual MOS being predicted.

Previous studies on retention patterns in the Navy have found similar variations in prediction error based on model specification.[40] Hansen and Wenger found that excluding explanatory variables from their baseline model changed the level of over-prediction, both up and down, depending on the variable(s) excluded.[41] For example, they found that by excluding race and age from their baseline model the percent error of over-prediction changed from 2.1 in the baseline model to 0.7 in the excluded model.[42] This would appear to indicate that the model that excludes race and age is better than the one that includes these two variables. However, Hansen and Wenger conclude that "the pay elasticity of reenlistment is highly sensitive to the choice of empirical specification."[43]

One additional measure of the accuracy of the model specification is the confidence interval around the prediction. Although the point prediction may vary by MOS and may be more accurate for one model vice the other, the confidence interval around the prediction presents the "spread" around a prediction. A smaller spread indicates a better model because the prediction error is reduced, producing a smaller range of possible outcomes. This thesis examined the confidence interval around the prediction for the two models— one with and one without deployment tempo variables. The model that includes deployment tempo variables not only has larger pseudo-R^2 and chi-square values, it also has a narrower confidence interval around the prediction when compared to the model that omits deployment variables. The combination of the higher pseudo-R^2 and chi-square values, and the narrower confidence interval around the prediction suggest that incorporating deployment tempo variables in the estimating model is worthwhile.

[40] Michael L. Hansen, and Jennie W. Wenger, "Why Do Pay Elasticity Estimates Differ?", Center for Naval Analyses, March 2002, 61.

[41] Ibid., 60.

[42] Ibid., 60.

[43] Ibid., 67.

On the surface it may appear that the model that omits deployment variables is a more accurate predictor of reenlistment, but this may not necessarily be true. It must also be noted that the validation contained in this chapter only analyzes predictions for one fiscal year and there could be unobservable factors that are not being accounted for in fiscal year 2007.

E. SUMMARY

This chapter has provided an analysis of the usefulness of the models contained in Chapter IV. Overall, the models developed are moderately accurate in predicting reenlistment decisions for all MOSs. However, the models become far more accurate when predicting reenlistments in what are considered high-density MOSs. The improved accuracy is likely due to the large sample size of the high-density MOSs, which improves statistical significance.

Table 20 displays the predicted reenlistment rate for alternate SRB multiples (0-5) for the 27 high-density MOSs using the Validation Model that includes deployment variables and using individual MOS mean values for the explanatory variables. The results are comparable to the North study.[44] This thesis finds that Marines in combat arms MOSs have smaller predicted reenlistment rates than their counterparts in the support MOSs, these findings are similar to those the 1994 North study.

[44] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 34.

Table 20. FY07 Predicted Reenlistment Rates (Selected MOSs) – Using Individual MOS Mean Values for the Explanatory Variables (SRB Multiples 0-5)

FY07 Predicted Reenlistment Rates (Selected MOSs) - 0-5 SRB Multiple						
MOS	***SRB Multiple***					
	0	1	2	3	4	5
mos_0121	0.36	0.39	0.43	0.46	0.50	0.54
mos_0151	0.47	0.51	0.54	0.58	0.61	0.65
mos_0311	0.15	0.17	0.20	0.22	0.25	0.28
mos_0331	0.16	0.18	0.21	0.23	0.26	0.29
mos_0341	0.14	0.16	0.18	0.21	0.23	0.26
mos_0351	0.15	0.17	0.19	0.21	0.24	0.26
mos_0621	0.24	0.26	0.29	0.33	0.36	0.39
mos_0651	0.17	0.20	0.22	0.25	0.28	0.31
mos_0656	0.16	0.18	0.20	0.23	0.26	0.29
mos_0811	0.20	0.22	0.25	0.28	0.31	0.34
mos_1341	0.24	0.27	0.30	0.33	0.37	0.40
mos_1345	0.22	0.25	0.28	0.31	0.34	0.37
mos_1371	0.24	0.27	0.30	0.33	0.37	0.40
mos_1391	0.27	0.30	0.34	0.37	0.40	0.44
mos_1833	0.25	0.28	0.31	0.34	0.37	0.41
mos_2311	0.31	0.34	0.37	0.41	0.44	0.48
mos_3043	0.42	0.46	0.49	0.53	0.57	0.60
mos_3051	0.31	0.35	0.38	0.42	0.45	0.49
mos_3381	0.29	0.33	0.36	0.39	0.43	0.47
mos_3521	0.30	0.33	0.37	0.40	0.44	0.48
mos_3531	0.29	0.32	0.36	0.39	0.43	0.46
mos_3533	0.21	0.23	0.26	0.29	0.32	0.36
mos_5811	0.24	0.27	0.29	0.33	0.36	0.39
mos_6046	0.35	0.39	0.42	0.46	0.49	0.53
mos_6531	0.28	0.31	0.35	0.38	0.42	0.45
mos_6672	0.40	0.44	0.47	0.51	0.55	0.58
mos_7051	0.25	0.28	0.31	0.34	0.37	0.41

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VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

This thesis developed and estimated four alternate logit models to predict reenlistment rates for first-term Marines by Military Occupational Specialty. The goal was to determine the effect of incorporating deployment tempo into the statistical models on their predictive accuracy. This technique determined the effect of the Selective Reenlistment Bonus multiple in a manner different from those in use by the Marine Corps. The current SRB prediction model in use by Marine Corps manpower planners does not include controls for varying levels of deployment tempo.

The results of the multivariate models clearly show that SRB multiples are a positive and statistically significant predictor of increased reenlistments. Additionally, the results show that high deployment tempo is a statistically significant, independent, negative, predictor of reenlistments. This thesis also analyzed the validity and statistical usefulness of the logit models developed. The validation results indicate that the logit models are an accurate predictor of reenlistment decisions for high-density MOSs and are a fairly accurate predictor of reenlistment decisions for all other MOSs.

B. THESIS RESEARCH QUESTIONS

1. How has the Increased Deployment Tempo since 9/11 Affected First-Term Enlisted Reenlistment Rates by MOS?

The results of this thesis indicate that the increased deployment tempo has had a significant negative effect on reenlistment rates. This statement can be made due to several results highlighted in this thesis. Despite overall reenlistments rates remaining fairly steady over time, there are several key conclusions to be drawn from this analysis. First, reenlistments are negatively correlated with the number of deployed days. Reenlistment rates appear to decrease from 35 percent for Marines with zero deployed days to 28 percent for Marines with more than 400 deployed days. To explain why overall reenlistment rates have remained steady over time this thesis analyzed the effect of SRB multiples as deployment tempo increased. Average days deployed to OIF/OEF

have steadily increased from fiscal year 2003 to fiscal year 2007. The average deployed days in fiscal year 2003 was 55 compared to 259 days in fiscal year 2007. Additionally, the average SRB offer has increased over this same period. The average SRB offer in fiscal year 2003 was less than 1.0, whereas, it was nearly 2.0 in fiscal year 2007. The Marine Corps appears to have been steadily increasing SRB offers, across all MOSs and zones, in an attempt to offset the negative effect of increased deployment tempo on reenlistments. This has resulted in the Marine Corps SRB budget increasing by over $200 million in the past five years, ($58 million in FY02 vice $268 million in FY07). [45]

2. Has the Increased Deployment Tempo Affected the Magnitude of the Effect of SRBs on Reenlistment Behavior?

The results of this thesis indicate that the effect of the SRB multiple on reenlistment decisions has decreased over time. This can be highlighted by the marginal effects of the SRB multiple developed in this thesis as compared to the results in the earlier North study. However, the results of this thesis are nearly identical to those found in a 2006 CNA study, which had a more similar model specification and sample data. Table 20 displays the marginal effects of SRB multiples on reenlistment decisions from this study compared to the 2006 CNA study[46] and the North study.[47] It appears that the marginal effect of SRB offers on reenlistments has decreased. However, this difference could also be explained by other factors. First, North excluded "restricted MOSs" from his data sample, which reduced his sample size, and did not include all MOSs. In contrast, this thesis and the 2006 CNA study did not exclude any MOSs from their samples. Second, North's model specification was different than those in this thesis, as well as those in the 2006 CNA study. The results of this thesis are more comparable to the 2006 CNA, which also controlled for deployment tempo. Therefore, it is highly

[45] Paul Bock, e-mail to author, October 22, 2008.

[46] Hattiangadi, and Shuford, and Quester, "Marine Corps Retention in the Post 9/11 Era: The Effects of Deployment Tempo on Marines With and Without Dependents," 40.

[47] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 28.

likely that differences in model specification, sample restrictions, and potential structural changes in the reenlistment behavior of first-term Marines over time account for the variation in the estimated effects of SRB multiples.

Table 21. Estimated Marginal Effects of SRB Multiple

	Model #1	Model #2	Model #3	Model #4	CNA 2006[48]	North[49]
SRB Multiple	.024	.0221	.0215	.0202	.024	.071

3. Is There a Difference in Reenlistment Rates for Marines with and without Dependents?

The results of this thesis clearly show that there is a sizeable difference in reenlistment rates for Marines with and without dependents. The overall reenlistment rate for Marines with dependents is .37 compared to .23 for Marines without dependents. This finding is comparable to results found in previous CNA studies on USMC reenlistment.[50] The adage that you "enlist the Marine and retain the family" appears to still hold true. Additionally, Marines with dependents deploy less than Marines without dependents. This study found that, on average, Marines without dependents deploy 21.6 more days during their first enlistment than do Marines with dependents.

4. What are the Effects of Not Deploying at all on Individuals' Reenlistment Decisions?

This thesis finds that not deploying at actually increases reenlistments. Overall, Marines who did not deploy reenlisted at slightly higher rates than Marines who deployed for at least 1 day, and much higher rates than for Marines who deployed 100+ days. Table 21 depicts the reenlistment rates for varying levels of deployment tempo.

[48] Hattiangadi, and Shuford, and Quester, "Marine Corps Retention in the Post 9/11 Era: The Effects of Deployment Tempo on Marines With and Without Dependents," 40.

[49] North, "A Cost-Effective Use of Selective Reenlistment Bonuses and Lateral Occupational Moves," 28.

[50] Ibid., 11-14.

Table 22. Actual Reenlistment Rates by Deployed Days

Deployed Days in First-Term	Reenlistment Rate
0	.354
1-100	.334
101-200	.265
201-300	.274
301-400	.270
More than 400	.277

5. Is the Prediction Model More Accurate with Deployment Variables?

The results of this thesis are not conclusive in determining if incorporating deployment variables into the prediction model yields a more accurate model. The validation models estimated in Chapter IV show that both models, with and without deployment variables, had very similar results in predicting reenlistments for fiscal year 2007. However, this thesis, along with prior CNA studies, has shown that deployment tempo is a significant factor in first-term Marines' reenlistment decisions. Table 23 displays the average percent prediction error for each of the validation models when predicting fiscal year 2007 reenlistment rates for the 27 high-density MOSs.

Table 23. Fiscal Year 2007 Predicted Reenlistment Rates (Selected MOSs) – Validation Models with and without Deployment Tempo Variables

	With Deployment – USMC Means	Without Deployment – USMC Means	With Deployment – MOS Means	Without Deployment – MOS Means
Average Percent Error	.0147	0.127	0.12	0.117

Additionally, three other statistical measures that highlight the "worth" of a model; the confidence interval around the prediction, pseudo-R^2, and the chi-square value, are all improved when the estimating models include deployment tempo variables. The combination of the higher pseudo-R^2 and chi-square values, and the narrower confidence interval around the prediction suggest that incorporating deployment tempo variables in the estimating model is worthwhile.

C. RECOMMENDATIONS

1. Validation with Fiscal Year 2008 and 2009 Reenlistment Data

Although this thesis attempted to validate the prediction results, the validation exercise was based only on one fiscal year and the results are not sufficiently strong for the Marine Corps to change its current method for determining SRB offers. To further determine the predictive ability of the models, it is recommended that the models in this study be used to predict the actual reenlistment rates for fiscal year 2008, which are currently available, and for fiscal year 2009 when they become available later this year. By doing so, there would be a total of three years worth of validation results to ensure that the predictive accuracy of this model is acceptable.

2. Update Model on a Fiscal Year Basis

It is also recommended that the models developed in this thesis be updated each fiscal year with current reenlistment data. Labor economic theory suggests that the model will remain relevant unless there have been structural changes in Marines' behavior. Given the changing nature of the "Long War", this study recommends that the model be updated each fiscal year with the latest data to ensure the model is capturing any structural changes that may occur during this period. Additionally, the volatile state of the economy and employment conditions should have a significant impact on reenlistment decisions in fiscal year 2008, and especially in 2009. The data needed to update the logit models is readily available from the Total Force Data Warehouse and can be easily coded to replicate the analysis in this thesis.

3. Incorporate Local Area Unemployment Data into the Prediction Models

This thesis attempted to add proxies for economic conditions in the form of national-level unemployment rates; however, the results were not consistent with previous studies, nor with economic theory. A more accurate measure of economic conditions that might affect a Marines' decision to reenlist would be in the form of local area unemployment rates based on a Marines' home of record. More often than not, first-term Marines who choose not to reenlist return to their home of record; therefore, the

unemployment rate for that area would more accurately account for the economic opportunities available to a particular Marine. It is recommended that further research into first-term reenlistment decisions include local level unemployment data for a Marines' home of record to better account for his/her particular economic opportunities. The data needed for this analysis is readily available from the Total Force Data Warehouse and the Bureau of Labor Statistics.

APPENDIX A. MILITARY OCCUPATIONAL SPECIALTY LISTING

MOS CODE	MOS TITLE
0121	Personnel Clerk
0151	Administrative Clerk
0161	Postal Clerk
0193	Personnel/Administrative Chief
0211	Counterintelligence/HUMINT Specialist
0231	Intelligence Specialist
0241	Imagery Analysis Specialist
0261	Geographic Intelligence Specialist
0311	Rifleman
0313	LAV Crewman
0321	Reconnaissance Man
0331	Machine Gunner
0341	Mortarman
0351	Infantry Assaultman
0352	Anti-Tank Missileman
0369	Infantry Unit Leader
0411	Maintenance Management Specialist
0431	Logistics/Embarkation Specialist
0451	Air Delivery Specialist
0481	Landing Support Specialist
0511	MAGTF Planning Specialist
0612	Tactical Switching Operator
0613	Construction Wireman
0614	Unit Level Circuit Switch Operator
0619	Wire Chief
0621	Field Radio Operator
0622	Digital Wideband Transmission Equipment Operator
0623	Tropospheric Scatter Radio Multi-Channel Equipment Operator
0624	High Frequency Communication Central Operator
0626	Fleet SATCOM Terminal Operator
0627	SHF Satellite Communications Operator
0629	Radio Chief
0651	Data Network Specialist

MOS CODE	MOS TITLE
0656	Tactical Network Specialist
0689	Information Assurance Technician
0811	Field Artillery Cannoneer
0842	Field Artillery Radar Operator
0844	Field Artillery Fire Control Man
0847	Artillery Meteorological Man
0861	Fire Support Man
1141	Electrician
1142	Engineer Equipment Electrical Systems Technician
1161	Refrigeration and Air Conditioning Technician
1171	Water Support Technician
1181	Fabric Repair Specialist
1316	Metal Worker
1341	Engineer Equipment Mechanic
1345	Engineer Equipment Operator
1361	Engineer Assistant
1371	Combat Engineer
1391	Bulk Fuel Specialist
1812	M1A1 Tank Crewman
1833	Assault Amphibious Vehicle (AAV) Crewman
2111	Small Arms Repairer/Technician
2131	Towed Artillery Systems Technician
2141	Assault Amphibious Vehicle (AAV) Repairer/Technician
2146	Main Battle Tank Repairer/Technician
2147	Light Armored Vehicle (LAV) Repairer/Technician
2161	Machinist
2171	Electro-Optical Ordnance Repairer
2311	Ammunition Technician
2336	Explosive Ordnance Disposal (EOD)
2621	Special Communications Signals Collection Operator
2631	Electronic Intelligence Intercept Operator
2651	Special Intelligence Systems Administrator
2671	Middle East Cryptologic Linguist
2673	Asia-Pacific Cryptologic Linguist
2674	Cryptologic Linguist I
2676	Cryptologic Linguist II

MOS CODE	MOS TITLE
2818	Personal Computer/Tactical Office Machine Repairer
2822	Electronic Equipment Switching Technician
2823	Technical Control Chief
2831	AN/TRC-170 Technician
2834	Satellite Communications Technician
2841	Ground Radio Repairer
2844	Ground Communications Organizational Repairer
2846	Ground Intermediate Repairer
2847	Telephone Systems/Personal Computer Intermediate Repairer
2862	Electronics Maintenance Technician
2871	Calibration Technician
2874	Metrology Technician
2881	2M/ATE Technician
2887	Artillery Electronics Technician
3043	Supply Administration and Operations Specialist
3051	Warehouse Clerk
3052	Packaging Specialist
3112	Distribution Management Specialist
3381	Food Service Specialist
3432	Finance Technician
3451	Financial Management Resource Analyst
3521	Automotive Organizational Mechanic
3529	Motor Transport Maintenance Chief
3531	Motor Vehicle Operator
3533	Logistics Vehicle Systems Operator
3537	Motor Transport Operation Chief
4066	Small Computer Systems Specialist
4067	Programmer
4133	Marine Corps Community Services Marine
4341	Combat Correspondent
4421	Legal Services Specialist
4611	Combat Illustrator
4612	Combat Camera Production Specialist
4641	Combat Photographer
4671	Combat Videographer
5512	Member, “Commandants Own”, Drum and Bugle Corps

MOS CODE	MOS TITLE
5524	Musician
5711	Chemical, Biological, Radiological, and Nuclear Defense Specialist
5811	Military Police
5821	Criminal Investigator CID Agent
5831	Correctional Specialist
5937	Aviation Radio Repairer
5939	Aviation Communications Systems Technician
5942	Aviation Radar Repairer
5952	Air Traffic Control Navigational Aids Technician
5953	Air Traffic Control Radar Technician
5954	Air Traffic Control Communications Technician
5962	Tactical Data Systems Equipment Repairer
5963	Tactical Air Operations Module Repairer
5974	Tactical Data Systems Administrator
5979	Tactical Air Operations Module/Air Defense Technician
6042	Individual Material Readiness List (IMRL) Asset Manager
6046	Aircraft Maintenance Administrative Specialist
6048	Flight Equipment Technician
6062	Aircraft Intermediate Level Hydraulic Mechanic
6072	Aircraft Maintenance Supply Equipment Mechanic
6073	Aircraft Maintenance Support Equipment Electrician
6074	Cryogenics Equipment Operator
6092	Aircraft Intermediate Level Structures Mechanic
6112	Helicopter Mechanic, CH-46
6113	Helicopter Mechanic, CH-53
6114	Helicopter Mechanic,UH/AH-1
6116	Tiltrotor Mechanic, MV-22
6122	Helicopter Power Plants Mechanic, T-400/T-700
6123	Helicopter Power Plants Mechanic, T-58
6124	Helicopter Power Plants Mechanic, T-64
6132	Helicopter/Tiltrotor Dynamic Components Mechanic
6152	Helicopter Airframe Mechanic, CH-46
6153	Helicopter Airframe Mechanic, CH-53
6154	Helicopter Airframe Mechanic, UH/AH-1
6156	Tiltrotor Airframe Mechanic, MV-22
6172	Helicopter Crew Chief, CH-46

MOS CODE	MOS TITLE
6173	Helicopter Crew Chief, CH-53
6174	Helicopter Crew Chief, UH-1
6176	Tiltrotor Crew Chief, MV-22
6212	Fixed-Wing Aircraft Mechanic, AV-8/TAV-8
6213	Fixed-Wing Aircraft Mechanic, EA-6
6214	Unmanned Aerial Vehicle (UAV) Mechanic
6216	Fixed-Wing Aircraft Mechanic, KC-130
6217	Fixed-Wing Aircraft Mechanic, F/A-18
6222	Fixed-Wing Aircraft Power Plants Mechanic, F-402
6223	Fixed-Wing Aircraft Power Plants Mechanic, J-52
6226	Fixed-Wing Aircraft Power Plants Mechanic, T-56
6227	Fixed-Wing Aircraft Power Plants Mechanic, F-404
6232	Fixed Wing Aircraft Flight Mechanic, KC-130
6252	Fixed-Wing Aircraft Airframe Mechanic, AV-8/TAV-8
6253	Fixed-Wing Aircraft Airframe Mechanic, EA-6
6256	Fixed-Wing Aircraft Airframe Mechanic, KC-130
6257	Fixed-Wing Aircraft Airframe Mechanic, F/A-18
6276	Fixed-Wing Aircraft Crew Chief, KC-130
6282	Fixed-Wing Aircraft Safety Equipment Mechanic, AV-8/TAV-8
6283	Fixed-Wing Aircraft Safety Equipment Mechanic, EA-6
6286	Fixed-Wing Aircraft Safety Equipment Mechanic, KC-130/V-22
6287	Fixed-Wing Aircraft Safety Equipment Mechanic, F/A-18
6311	Aircraft Communications/Navigation/Electrical Systems Trainee
6312	Aircraft Communications /Navigation/Radar Technician, AV-8
6313	Aircraft Communications /Navigation/Radar Technician, EA-6
6314	Unmanned Aerial System (UAS) Avionics Technician
6316	Aircraft Communications /Navigation Systems Technician, KC-130
6317	Aircraft Communications /Navigation/Radar Technician, F/A-18
6322	Aircraft Communications /Navigation/Electrical Technician, CH-46
6323	Aircraft Communications /Navigation/Electrical Technician, CH-53
6324	Aircraft Communications /Navigation/Electrical Technician, U/AH-1
6326	Aircraft Communications /Navigation/Electrical Technician, V-22
6332	Aircraft Electrical Systems Technician, AV-8
6333	Aircraft Electrical Systems Technician, EA-6
6335	Aircraft Electrical Systems Technician
6336	Aircraft Electrical Systems Technician, KC-130

MOS CODE	MOS TITLE
6337	Aircraft Electrical Systems Technician, F/A-18
6386	Aircraft Electronics Countermeasures Systems Technician, EA-6B
6412	Aircraft Communications System Technician
6413	Aircraft Navigation Systems Technician
6414	Advanced Aircraft Communications Systems Technician
6423	Aviation Electronic Instrument and Cable Repair Technician
6432	Aircraft Electrical Flight Control Systems Technician, Fixed-Wing
6433	Aircraft Electrical Flight Control Systems Technician, Helicopter
6461	Hybrid Test Set Technician, IMA
6462	Avionics Test Set Technician
6463	CASS HP Configuration Operator/Maintainer/Technician
6464	Aircraft Inertial Navigation System Technician
6466	CASS EO Configuration Operator/Maintainer/Technician
6467	Consolidated Automated Support System Technician
6482	Aircraft Electronics Countermeasures Systems Technician, Fixed-Wing
6483	Aircraft Electronics Countermeasures Systems Technician, Helicopter
6484	CASS EW Configuration Operator/Maintainer/Technician
6492	Aviation Precision Measurement Equipment Repair Technician
6493	Aviation Meteorological Equipment Technician
6531	Aircraft Ordnance Technician
6541	Aviation Ordnance Systems Technician
6672	Aviation Supply Specialist
6694	Aviation Logistics Information Management Specialist
6821	METOC Observer
6842	METOC Analyst Forecaster
7011	Expeditionary Airfield Systems Technician
7041	Aviation Operations Specialist
7051	Aircraft Rescue and Firefighting Specialist
7212	Low Altitude Air Defense (LAAD) Gunner
7234	Air Control Electronics Operator
7236	Tactical Air Defense Controller
7242	Air Support Operations Operator
7257	Air Traffic Controller
7314	Unmanned Aerial Vehicle (UAV) Operator
7372	Tactical Systems Operator/Mission Specialist
7382	Airborne Radio Operator/Loadmaster

APPENDIX B. LOGISTIC REGRESSION RESULTS

	(1)	(2)	(3)	(4)
	reenlist	reenlist	reenlist	reenlist
srb_multiple	0.11600	0.10571	0.10218	0.09624
	(0.01134)***	(0.01116)***	(0.01109)***	(0.01100)***
_1_to_100_gwot_days_deployed	-0.09003	-0.06732	-0.01980	
	(0.03155)***	(0.03099)**	(0.03079)	
_101_to_200_gwot_days_deployed	-0.40787	-0.39180	-0.34408	
	(0.02015)***	(0.01975)***	(0.01956)***	
_201_to_300_gwot_days_deployed	-0.37492	-0.39048	-0.33910	
	(0.02280)***	(0.02233)***	(0.02221)***	
_301_to_400_gwot_days_deployed	-0.40938	-0.41609	-0.37575	
	(0.02632)***	(0.02578)***	(0.02572)***	
more_than_400_gwot_days_deployed	-0.33070	-0.36684	-0.33166	
	(0.02765)***	(0.02708)***	(0.02703)***	
unemployment_rate			-0.09238	-0.02401
			(0.01193)***	(0.01103)**
mil_civ_pay_ratio			2.53602	2.14039
			(0.26340)***	(0.26152)***
FY04	0.63848	0.61900		
	(0.02322)***	(0.02283)***		
FY05	0.55789	0.53888		
	(0.02444)***	(0.02401)***		
FY06	0.42581	0.44807		
	(0.02644)***	(0.02600)***		
FY07	0.47270	0.51853		
	(0.02742)*	(0.02696)*		

	**	**		
married	0.65306			
	(0.01406)***			
female	-0.21988			
	(0.02941)***			
E4	0.77123			
	(0.02789)***			
E5	0.97482			
	(0.02973)***			
E6	1.27231			
	(0.15563)***			
mos_0121	0.78720	0.79965	0.82082	0.96098
	(0.05585)***	(0.05479)***	(0.05449)***	(0.05394)***
mos_0151	1.24545	1.22486	1.23814	1.36982
	(0.05399)***	(0.05292)***	(0.05264)***	(0.05214)***
mos_0161	1.21155	1.13524	1.14720	1.18014
	(0.12301)***	(0.12037)***	(0.11989)***	(0.11954)***
mos_0193	0.42307	0.95463	0.97493	1.19529
	(0.79566)	(0.77029)	(0.76528)	(0.76489)
mos_0211	-0.71558	-0.33364	-0.30879	-0.26134
	(0.81058)	(0.80573)	(0.80398)	(0.80303)
mos_0231	0.40778	0.53912	0.51948	0.53396
	(0.08669)***	(0.08487)***	(0.08407)***	(0.08382)***
mos_0241	1.72935	2.27775	2.27963	2.37734
	(0.81148)**	(0.80555)***	(0.80476)***	(0.80230)***
mos_0261	-0.18003	-0.12960	-0.13363	-0.11174
	(0.20933)	(0.20626)	(0.20523)	(0.20460)
mos_0313	-0.08958	-0.03921	-0.03935	-0.05834
	(0.09077)	(0.08944)	(0.08935)	(0.08919)
mos_0321	0.31705	0.37142	0.37935	0.35860
	(0.09150)***	(0.09013)***	(0.08980)***	(0.08954)***
mos_0331	0.01193	0.05679	0.05895	0.05050
	(0.05177)	(0.05097)	(0.05089)	(0.05082)

mos_0341	-0.11408	-0.07203	-0.07160	-0.07705
	(0.05234)**	(0.05155)	(0.05147)	(0.05140)
mos_0351	-0.06770	-0.05170	-0.04703	-0.05066
	(0.06168)	(0.06076)	(0.06067)	(0.06059)
mos_0352	0.08255	0.20803	0.21467	0.19687
	(0.08127)	(0.07996)***	(0.07981)***	(0.07968)**
mos_0369	-1.34214	-0.64735	-0.63402	-0.56573
	(0.77680)*	(0.75736)	(0.75479)	(0.75374)
mos_0411	0.75080	0.71990	0.72134	0.77099
	(0.08631)***	(0.08438)***	(0.08407)***	(0.08379)***
mos_0431	0.87470	0.92122	0.94398	0.97593
	(0.07776)***	(0.07649)***	(0.07621)***	(0.07599)***
mos_0451	0.53088	0.45636	0.45684	0.50310
	(0.18409)***	(0.18096)**	(0.18078)**	(0.18022)***
mos_0481	0.15535	0.25399	0.24735	0.23554
	(0.09581)	(0.09441)***	(0.09418)***	(0.09399)**
mos_0511	0.41546	0.42521	0.40468	0.48307
	(0.17527)**	(0.17236)**	(0.17122)**	(0.17065)***
mos_0612	0.33387	0.39903	0.39636	0.39639
	(0.07281)***	(0.07161)***	(0.07144)***	(0.07129)***
mos_0613	0.12890	0.25673	0.26887	0.38114
	(0.22127)	(0.21763)	(0.21705)	(0.21568)*
mos_0614	0.10095	0.10610	0.12229	0.13029
	(0.13684)	(0.13495)	(0.13484)	(0.13448)
mos_0619	1.07059	1.52352	1.46138	1.39331
	(1.42007)	(1.41500)	(1.41516)	(1.41476)
mos_0621	0.42912	0.49133	0.50327	0.49949
	(0.04529)***	(0.04453)***	(0.04437)***	(0.04426)***
mos_0622	-0.10286	-0.06262	-0.06659	-0.07856
	(0.10441)	(0.10321)	(0.10293)	(0.10270)
mos_0623	1.31400	1.11981	1.23976	1.51857
	(1.41684)	(1.41497)	(1.41495)	(1.41488)
mos_0624	0.25093	0.44774	0.23572	0.23248
	(0.66745)	(0.66362)	(0.66049)	(0.65890)
mos_0626	-0.93360	-0.92035	-0.87099	-0.85972

	(0.75396)	(0.74573)	(0.74496)	(0.74420)
mos_0627	0.02136	0.11043	0.09490	0.08870
	(0.17780)	(0.17554)	(0.17492)	(0.17451)
mos_0629	0.01553	0.69760	0.70446	0.74132
	(1.23872)	(1.23126)	(1.22723)	(1.22585)
mos_0651	-0.10177	-0.06298	-0.04601	0.04092
	(0.08766)	(0.08653)	(0.08628)	(0.08596)
mos_0656	-0.09000	-0.03062	-0.01047	0.04422
	(0.08144)	(0.08044)	(0.08017)	(0.07995)
mos_0689	0.50105	1.09346	1.16899	1.26898
	(1.51062)	(1.44234)	(1.43467)	(1.41765)
mos_0811	0.17695	0.23197	0.24133	0.23246
	(0.05945)***	(0.05846)***	(0.05832)***	(0.05816)***
mos_0842	0.32130	0.38861	0.37376	0.32988
	(0.22553)	(0.22282)*	(0.22211)*	(0.22168)
mos_0844	0.42093	0.49698	0.51510	0.53243
	(0.09071)***	(0.08897)***	(0.08868)***	(0.08843)***
mos_0847	0.78489	0.89431	0.87420	0.92240
	(0.27392)***	(0.27017)***	(0.26942)***	(0.26862)***
mos_0861	0.36362	0.45389	0.46838	0.47087
	(0.13548)***	(0.13278)***	(0.13248)***	(0.13232)***
mos_1141	0.53215	0.48872	0.48577	0.50468
	(0.10605)***	(0.10376)***	(0.10338)***	(0.10314)***
mos_1142	0.52471	0.56738	0.55012	0.56494
	(0.09615)***	(0.09442)***	(0.09406)***	(0.09386)***
mos_1161	0.34059	0.34467	0.33606	0.35793
	(0.13083)***	(0.12879)***	(0.12836)***	(0.12804)***
mos_1171	0.60646	0.58876	0.58129	0.59108
	(0.09229)***	(0.09069)***	(0.09035)***	(0.09014)***
mos_1181	0.38880	0.52645	0.51683	0.57760
	(0.28210)	(0.27743)*	(0.27674)*	(0.27604)**
mos_1316	0.35824	0.40289	0.39697	0.41375
	(0.14927)**	(0.14656)***	(0.14613)***	(0.14582)***
mos_1341	0.38260	0.45522	0.44507	0.45920

	(0.07763)***	(0.07651)***	(0.07625)***	(0.07609)***
mos_1345	0.24882	0.30303	0.29562	0.28192
	(0.07559)***	(0.07442)***	(0.07420)***	(0.07407)***
mos_1361	0.60263	0.59007	0.59584	0.61554
	(0.20224)***	(0.19869)***	(0.19782)***	(0.19737)***
mos_1371	0.30625	0.40305	0.39962	0.37573
	(0.06024)***	(0.05939)***	(0.05922)***	(0.05906)***
mos_1391	0.46221	0.47808	0.46831	0.47630
	(0.07818)***	(0.07700)***	(0.07671)***	(0.07653)***
mos_1812	0.48209	0.57823	0.57395	0.52291
	(0.11050)***	(0.10868)***	(0.10843)***	(0.10821)***
mos_1833	0.37279	0.45495	0.46738	0.42779
	(0.06618)***	(0.06507)***	(0.06487)***	(0.06469)***
mos_2111	0.60726	0.63867	0.64863	0.71527
	(0.07559)***	(0.07427)***	(0.07396)***	(0.07369)***
mos_2131	0.33354	0.35018	0.35594	0.37580
	(0.16549)**	(0.16311)**	(0.16255)**	(0.16210)**
mos_2141	0.31075	0.48042	0.49547	0.49963
	(0.09681)***	(0.09515)***	(0.09491)***	(0.09455)***
mos_2146	0.58886	0.66120	0.65869	0.63698
	(0.12882)***	(0.12635)***	(0.12604)***	(0.12567)***
mos_2147	0.37591	0.49281	0.49181	0.48121
	(0.12842)***	(0.12629)***	(0.12597)***	(0.12569)***
mos_2161	0.27585	0.35125	0.34754	0.41885
	(0.19153)	(0.18819)*	(0.18737)*	(0.18680)**
mos_2171	0.21134	0.32300	0.31444	0.32722
	(0.13122)	(0.12938)**	(0.12892)**	(0.12863)**
mos_2311	0.67783	0.74630	0.75044	0.79139
	(0.07293)***	(0.07149)***	(0.07115)***	(0.07091)***

mos_2336	1.95100	2.24962	2.34621	2.32016
	(0.57614)***	(0.56860)***	(0.56918)***	(0.56795)***
mos_2621	0.42893	0.55008	0.57409	0.64252
	(0.11006)***	(0.10829)***	(0.10805)***	(0.10767)***
mos_2631	0.30208	0.43153	0.41138	0.48385
	(0.21448)	(0.21145)**	(0.21040)**	(0.20984)**
mos_2651	0.31326	0.42184	0.45191	0.50027
	(0.14009)**	(0.13775)***	(0.13755)***	(0.13710)***
mos_2671	-0.44953	-0.22177	-0.20651	-0.19025
	(0.18148)**	(0.17898)	(0.17851)	(0.17821)
mos_2673	-0.10987	0.03727	0.05636	0.23224
	(0.26681)	(0.26221)	(0.26114)	(0.26032)
mos_2674	-0.03671	0.10580	0.13022	0.24339
	(0.18824)	(0.18544)	(0.18479)	(0.18421)
mos_2676	-0.03668	0.14048	0.15949	0.24612
	(0.20111)	(0.19811)	(0.19708)	(0.19655)
mos_2818	4.87202	4.99901	4.89793	5.02163
	(1.01868)***	(1.01636)***	(1.01529)***	(1.01485)***
mos_2822	0.29882	0.43359	0.45916	0.58055
	(0.21216)	(0.20912)**	(0.20877)**	(0.20801)***
mos_2823	0.93149	1.32053	1.28358	1.16139
	(0.61325)	(0.60804)**	(0.60823)**	(0.60702)*
mos_2831	0.48018	0.54745	0.54664	0.56750
	(0.17801)***	(0.17460)***	(0.17403)***	(0.17354)***
mos_2834	0.39485	0.66818	0.67773	0.63959
	(0.64287)	(0.63598)	(0.62923)	(0.62732)
mos_2841	6.22351	6.35532	6.31954	6.42117
	(1.00489)***	(1.00437)***	(1.00414)***	(1.00404)***
mos_2844	0.10585	0.26319	0.26765	0.29553
	(0.08537)	(0.08409)***	(0.08388)***	(0.08361)***
mos_2846	0.05978	0.19779	0.18227	0.21600
	(0.10548)	(0.10397)*	(0.10374)*	(0.10344)**

mos_2847	-0.16267	0.04145	0.05693	0.09903
	(0.10537)	(0.10394)	(0.10365)	(0.10336)
mos_2862	1.19541	1.93170	1.95712	1.98686
	(0.88488)	(0.86826)**	(0.86852)**	(0.86657)**
mos_2871	-0.30226	-0.14999	-0.12580	-0.02153
	(0.28948)	(0.28423)	(0.28315)	(0.28252)
mos_2874	0.44607	0.85806	0.76915	0.69648
	(1.24129)	(1.22572)	(1.22561)	(1.22539)
mos_2881	0.11685	0.27393	0.25858	0.31432
	(0.17012)	(0.16741)	(0.16703)	(0.16656)*
mos_2887	0.15111	0.33171	0.31357	0.36749
	(0.32890)	(0.32461)	(0.32137)	(0.32017)
mos_3043	1.04324	1.04990	1.06214	1.12889
	(0.05546)***	(0.05442)***	(0.05414)***	(0.05391)***
mos_3051	0.77566	0.76010	0.76110	0.80909
	(0.05942)***	(0.05827)***	(0.05799)***	(0.05778)***
mos_3052	1.03926	1.07167	1.07033	1.14282
	(0.16046)***	(0.15707)***	(0.15630)***	(0.15592)***
mos_3112	0.86260	0.89984	0.92235	1.07327
	(0.10520)***	(0.10349)***	(0.10299)***	(0.10246)***
mos_3381	0.67139	0.70880	0.70084	0.72860
	(0.06154)***	(0.06038)***	(0.06009)***	(0.05993)***
mos_3432	1.15268	1.13881	1.15407	1.26384
	(0.09007)***	(0.08818)***	(0.08772)***	(0.08727)***
mos_3451	1.04754	1.05959	1.07995	1.24488
	(0.13069)***	(0.12786)***	(0.12710)***	(0.12654)***
mos_3521	0.52840	0.63813	0.63628	0.64473
	(0.05304)***	(0.05221)***	(0.05200)***	(0.05189)***
mos_3529	0.81403	1.56446	1.44010	1.46841
	(1.01794)	(1.01432)	(1.00555)	(1.00111)
mos_3531	0.57277	0.63179	0.63571	0.65788
	(0.04827)***	(0.04750)***	(0.04731)***	(0.04717)***
mos_3533	0.31022	0.33543	0.32472	0.30919
	(0.06899)*	(0.06794)*	(0.06774)*	(0.06759)*

	**	**	**	**
mos_3537	-0.08221	0.38106	0.58307	0.79390
	(1.23985)	(1.22618)	(1.22534)	(1.22535)
mos_4066	4.06224	4.05457	3.98378	4.13026
	(0.34860)***	(0.34746)***	(0.34682)***	(0.34646)***
mos_4067	0.17605	0.26784	0.33374	0.50123
	(0.21224)	(0.20902)	(0.20799)	(0.20760)**
mos_4133	0.09115	0.70825	0.65375	0.75328
	(1.29001)	(1.23257)	(1.22800)	(1.22573)
mos_4341	0.61452	0.58107	0.61400	0.75958
	(0.14753)***	(0.14485)***	(0.14416)***	(0.14354)***
mos_4421	1.00078	0.90178	0.91877	1.05352
	(0.12151)***	(0.11845)***	(0.11791)***	(0.11737)***
mos_4611	0.56321	0.49896	0.49258	0.69816
	(0.32632)*	(0.31726)	(0.31551)	(0.31498)**
mos_4612	0.61006	0.40946	0.45435	0.57690
	(0.27707)**	(0.27088)	(0.27004)*	(0.26930)**
mos_4641	0.53995	0.47335	0.47131	0.56162
	(0.17853)***	(0.17443)***	(0.17379)***	(0.17331)***
mos_4671	0.58106	0.51139	0.54581	0.66496
	(0.22432)***	(0.21962)**	(0.21833)**	(0.21772)***
mos_5512	0.51906	0.42666	0.54662	0.82542
	(1.22571)	(1.22562)	(1.22560)	(1.22552)
mos_5524	0.73784	0.82966	0.85732	1.01549
	(0.09849)***	(0.09672)***	(0.09621)***	(0.09565)***
mos_5711	0.68715	0.72804	0.73693	0.78411
	(0.08780)***	(0.08630)***	(0.08603)***	(0.08572)***
mos_5811	0.28351	0.34943	0.36249	0.45413
	(0.05426)***	(0.05342)***	(0.05319)***	(0.05284)***
mos_5821	0.17852	0.90871	0.87761	0.99373
	(0.94229)	(0.92918)	(0.92268)	(0.91460)
mos_5831	0.52233	0.55656	0.56966	0.78884
	(0.10330)*	(0.10161)*	(0.10117)*	(0.10044)*

	**	**	**	**
mos_5937	0.75624	0.69082	0.73042	0.75585
	(0.20735)***	(0.20357)***	(0.20251)***	(0.20182)***
mos_5939	-0.33828	-0.44068	-0.41206	-0.37719
	(0.45759)	(0.45297)	(0.45260)	(0.45198)
mos_5942	0.48626	0.55201	0.51908	0.59375
	(0.18493)***	(0.18164)***	(0.18080)***	(0.18020)***
mos_5952	0.51569	0.70324	0.72011	0.75192
	(0.21816)**	(0.21453)***	(0.21347)***	(0.21268)***
mos_5953	0.24217	0.41896	0.44118	0.52691
	(0.17486)	(0.17205)**	(0.17113)***	(0.17066)***
mos_5954	0.43422	0.55519	0.54832	0.60340
	(0.17816)**	(0.17557)***	(0.17479)***	(0.17427)***
mos_5962	0.17160	0.27769	0.26892	0.33767
	(0.20632)	(0.20245)	(0.20157)	(0.20111)*
mos_5963	0.10080	0.29271	0.31462	0.43151
	(0.30167)	(0.29642)	(0.29489)	(0.29415)
mos_5974	0.42504	0.46975	0.56329	0.63624
	(0.54219)	(0.53630)	(0.53591)	(0.53406)
mos_5979	-0.33081	-0.11602	-0.15040	-0.03814
	(0.50327)	(0.49867)	(0.49836)	(0.49725)
mos_6042	0.62043	0.69652	0.68847	0.75878
	(0.14427)***	(0.14181)***	(0.14126)***	(0.14083)***
mos_6046	0.82102	0.91962	0.93157	1.00338
	(0.08392)***	(0.08250)***	(0.08215)***	(0.08185)***
mos_6048	0.22142	0.40878	0.42298	0.49546
	(0.10408)**	(0.10254)***	(0.10217)***	(0.10184)***
mos_6062	0.11679	0.29848	0.28879	0.34523
	(0.15655)	(0.15411)*	(0.15359)*	(0.15319)**
mos_6072	0.55389	0.75383	0.75469	0.82823
	(0.10384)***	(0.10212)***	(0.10173)***	(0.10139)***
mos_6073	0.39535	0.57828	0.59290	0.67858
	(0.13041)***	(0.12850)***	(0.12812)***	(0.12767)***

mos_6074	0.20906	0.34965	0.37150	0.48307
	(0.25007)	(0.24501)	(0.24407)	(0.24352)**
mos_6092	0.45059	0.66986	0.67537	0.73541
	(0.12217)***	(0.12066)***	(0.12016)***	(0.11978)***
mos_6112	0.32644	0.50324	0.51153	0.52985
	(0.11634)***	(0.11445)***	(0.11389)***	(0.11364)***
mos_6113	0.06691	0.27981	0.29636	0.34731
	(0.11757)	(0.11595)**	(0.11550)**	(0.11520)***
mos_6114	0.02364	0.21346	0.23122	0.25503
	(0.11547)	(0.11369)*	(0.11343)**	(0.11318)**
mos_6116	0.20496	0.30150	0.35416	0.56249
	(0.43993)	(0.43235)	(0.43078)	(0.42970)
mos_6122	0.41245	0.68893	0.72282	0.81179
	(0.20961)**	(0.20668)***	(0.20601)***	(0.20532)***
mos_6123	0.47176	0.72382	0.74373	0.86279
	(0.18481)**	(0.18233)***	(0.18168)***	(0.18106)***
mos_6124	0.90847	1.13914	1.12482	1.20803
	(0.22868)***	(0.22469)***	(0.22305)***	(0.22220)***
mos_6132	0.55822	0.72469	0.75436	0.82771
	(0.18740)***	(0.18404)***	(0.18366)***	(0.18304)***
mos_6152	0.20923	0.47333	0.45991	0.45444
	(0.13416)	(0.13245)***	(0.13190)***	(0.13162)***
mos_6153	0.19999	0.46248	0.47046	0.49816
	(0.11800)*	(0.11636)***	(0.11599)***	(0.11566)***
mos_6154	0.39055	0.59515	0.57681	0.60639
	(0.11524)***	(0.11324)***	(0.11276)***	(0.11255)***
mos_6156	0.99776	1.31994	1.35089	1.58585
	(0.55076)*	(0.54471)**	(0.54162)**	(0.54101)***
mos_6172	0.21140	0.37009	0.38124	0.41591
	(0.12214)*	(0.12045)***	(0.11996)***	(0.11966)***

mos_6173	0.16157	0.34232	0.36744	0.41985
	(0.13408)	(0.13188)***	(0.13155)***	(0.13111)***
mos_6174	0.48628	0.66800	0.70559	0.71794
	(0.18049)***	(0.17791)***	(0.17772)***	(0.17720)***
mos_6176	1.05230	1.12031	1.23120	1.53510
	(0.65632)	(0.64642)*	(0.64620)*	(0.64598)**
mos_6212	-0.07801	0.15666	0.15513	0.16867
	(0.15045)	(0.14866)	(0.14823)	(0.14786)
mos_6213	-0.10280	0.15695	0.16564	0.22301
	(0.36761)	(0.36478)	(0.36440)	(0.36379)
mos_6214	-0.24386	-0.12096	-0.15741	-0.20584
	(0.42092)	(0.41593)	(0.41595)	(0.41535)
mos_6216	0.30281	0.48673	0.52928	0.64372
	(0.20573)	(0.20286)**	(0.20261)***	(0.20183)***
mos_6217	0.15273	0.40982	0.41908	0.51105
	(0.12276)	(0.12055)***	(0.12006)***	(0.11962)***
mos_6222	0.20999	0.56942	0.60071	0.71096
	(0.24407)	(0.24062)**	(0.23992)**	(0.23913)***
mos_6223	-0.15742	0.15829	0.19794	0.36611
	(0.39527)	(0.39125)	(0.39089)	(0.39015)
mos_6226	0.24358	0.52435	0.55465	0.71246
	(0.27345)	(0.27002)*	(0.26921)**	(0.26850)***
mos_6227	0.71892	0.88313	0.91299	1.05172
	(0.20394)***	(0.19972)***	(0.19876)***	(0.19804)***
mos_6232	2.67872	2.68968	2.45503	2.57610
	(0.82159)***	(0.81893)***	(0.81803)***	(0.81766)***
mos_6252	-0.00665	0.26862	0.27904	0.29129
	(0.16101)	(0.15871)*	(0.15829)*	(0.15792)*
mos_6253	0.11242	0.35080	0.33670	0.42598
	(0.32365)	(0.31902)	(0.31855)	(0.31759)
mos_6256	0.62057	0.83784	0.86641	0.95677
	(0.18783)***	(0.18501)***	(0.18483)***	(0.18404)***
mos_6257	-0.02638	0.19644	0.21000	0.30931
	(0.15083)	(0.14891)	(0.14843)	(0.14796)*

				*
mos_6276	-0.29467	-0.08390	-0.03511	0.06147
	(0.21586)	(0.21280)	(0.21234)	(0.21164)
mos_6282	0.03409	0.27995	0.31559	0.32266
	(0.28645)	(0.28349)	(0.28304)	(0.28221)
mos_6283	0.71486	0.91669	0.89507	0.96237
	(0.42974)**	(0.42388)**	(0.42221)**	(0.42165)**
mos_6286	0.39045	0.51445	0.51189	0.56151
	(0.41197)	(0.40391)	(0.40196)	(0.39995)
mos_6287	0.36633	0.56663	0.58885	0.68159
	(0.23946)	(0.23485)**	(0.23413)**	(0.23351)***
mos_6311	3.90144	3.87164	3.89067	3.98419
	(0.74326)***	(0.73705)***	(0.73673)***	(0.73592)***
mos_6312	-0.12859	0.02356	0.02981	0.07331
	(0.20011)	(0.19738)	(0.19689)	(0.19641)
mos_6313	0.45417	0.56162	0.60154	0.70716
	(0.29483)	(0.28851)*	(0.28824)**	(0.28762)**
mos_6314	-0.06454	0.05702	0.05756	0.01057
	(0.43997)	(0.43236)	(0.43080)	(0.43048)
mos_6316	0.66821	0.76897	0.80711	0.90059
	(0.24960)***	(0.24506)***	(0.24429)***	(0.24333)***
mos_6317	0.68562	0.77508	0.80022	0.91093
	(0.13807)***	(0.13550)***	(0.13470)***	(0.13421)***
mos_6322	0.56553	0.65938	0.66481	0.68535
	(0.13144)***	(0.12924)***	(0.12863)***	(0.12832)***
mos_6323	0.47239	0.65794	0.68317	0.73407
	(0.10913)***	(0.10736)***	(0.10709)***	(0.10675)***
mos_6324	0.55733	0.70155	0.70642	0.72395
	(0.10953)***	(0.10779)***	(0.10739)***	(0.10715)***
mos_6326	0.40955	0.54353	0.67129	0.91955
	(0.43905)	(0.43182)	(0.43025)	(0.42940)**
mos_6332	-0.09341	0.08021	0.05962	0.09011
	(0.19869)	(0.19583)	(0.19516)	(0.19460)
mos_6333	-0.07809	0.04029	0.07919	0.18626

	(0.29146)	(0.28806)	(0.28781)	(0.28740)
mos_6335	3.59688	3.89123	3.87250	3.89513
	(1.05387)***	(1.05040)***	(1.04626)***	(1.04506)***
mos_6336	0.54050	0.67715	0.69003	0.77905
	(0.24885)**	(0.24224)***	(0.24056)***	(0.23952)***
mos_6337	0.49995	0.68713	0.68370	0.80888
	(0.14491)***	(0.14240)***	(0.14130)***	(0.14083)***
mos_6386	0.42487	0.48662	0.50560	0.59274
	(0.30116)	(0.29826)	(0.29725)*	(0.29692)**
mos_6412	0.31697	0.50862	0.51241	0.61716
	(0.15542)**	(0.15318)***	(0.15270)***	(0.15215)***
mos_6413	0.26152	0.46581	0.46496	0.54839
	(0.12945)**	(0.12749)***	(0.12690)***	(0.12648)***
mos_6414	0.59061	1.14330	1.21369	1.46145
	(1.44219)	(1.41495)	(1.41494)	(1.41532)
mos_6423	0.22857	0.37525	0.38685	0.49632
	(0.19232)	(0.18921)**	(0.18846)**	(0.18778)***
mos_6432	0.22460	0.33897	0.36633	0.50418
	(0.17930)	(0.17577)*	(0.17509)**	(0.17454)***
mos_6433	0.59348	0.68168	0.66490	0.70502
	(0.16890)***	(0.16643)***	(0.16554)***	(0.16511)***
mos_6461	-0.09390	-0.00730	0.00193	0.16203
	(0.30107)	(0.29745)	(0.29658)	(0.29584)
mos_6462	0.58971	0.67963	0.68014	0.84097
	(0.26127)**	(0.25672)***	(0.25590)***	(0.25521)***
mos_6463	1.04001	1.12017	1.14521	1.29976
	(0.33552)***	(0.32220)***	(0.31992)***	(0.31829)***
mos_6464	-0.47929	-0.21193	-0.16992	0.05139
	(0.40595)	(0.40040)	(0.39958)	(0.39913)
mos_6466	0.39494	0.55426	0.55277	0.68590
	(0.24821)	(0.24467)**	(0.24367)**	(0.24287)***
mos_6467	0.12484	0.20456	0.22012	0.35593

	(0.18983)	(0.18693)	(0.18620)	(0.18553)*
mos_6482	0.57881	0.73333	0.77575	0.87459
	(0.22005)***	(0.21772)***	(0.21687)***	(0.21623)***
mos_6483	0.98271	1.07491	1.05964	1.10922
	(0.19366)***	(0.18951)***	(0.18863)***	(0.18804)***
mos_6484	0.07959	0.22067	0.25747	0.49749
	(0.23674)	(0.23299)	(0.23268)	(0.23220)**
mos_6492	0.47012	0.65059	0.67072	0.80504
	(0.11488)***	(0.11299)***	(0.11259)***	(0.11204)***
mos_6493	0.61398	0.78845	0.74951	0.84431
	(0.31943)*	(0.31201)**	(0.30849)**	(0.30733)***
mos_6531	0.58984	0.61785	0.61454	0.66086
	(0.06881)***	(0.06766)***	(0.06741)***	(0.06718)***
mos_6541	0.63040	0.66217	0.65892	0.72579
	(0.08008)***	(0.07880)***	(0.07846)***	(0.07815)***
mos_6672	1.02537	1.06721	1.09074	1.18921
	(0.07138)***	(0.07003)***	(0.06968)***	(0.06935)***
mos_6694	0.54907	0.52660	0.55761	0.67178
	(0.15533)***	(0.15213)***	(0.15189)***	(0.15135)***
mos_6821	0.12033	0.19106	0.21566	0.27677
	(0.18246)	(0.17899)	(0.17814)	(0.17758)
mos_6842	0.68631	1.02742	1.04759	1.10142
	(0.47016)	(0.46422)**	(0.46163)**	(0.46016)**
mos_7011	0.23092	0.32980	0.33802	0.37315
	(0.14395)	(0.14168)**	(0.14124)**	(0.14088)***
mos_7041	1.03431	1.05516	1.06303	1.13411
	(0.09444)***	(0.09249)***	(0.09207)***	(0.09172)***
mos_7051	0.23416	0.30273	0.31432	0.40578
	(0.08571)***	(0.08433)***	(0.08403)***	(0.08367)***
mos_7212	0.26274	0.30902	0.30008	0.31765
	(0.10859)*	(0.10654)*	(0.10631)*	(0.10595)*

	*	**	**	**
mos_7234	0.42377	0.62756	0.62432	0.66340
	(0.16873)**	(0.16646)***	(0.16539)***	(0.16478)***
mos_7236	1.70906	1.98766	1.97665	1.87851
	(0.72194)**	(0.71167)***	(0.70893)***	(0.70799)***
mos_7242	0.73495	0.88405	0.89947	0.89805
	(0.15136)***	(0.14918)***	(0.14859)***	(0.14812)***
mos_7251	0.09528	-0.26365	-0.24882	-0.17715
	(1.10864)	(1.10315)	(1.09956)	(1.09623)
mos_7257	0.18586	0.36073	0.38171	0.45351
	(0.10065)*	(0.09876)***	(0.09814)***	(0.09761)***
mos_7314	0.01897	0.25471	0.27641	0.21292
	(0.33246)	(0.32723)	(0.32601)	(0.32570)
mos_7372	0.89726	1.04843	1.01054	1.13885
	(0.23721)***	(0.23512)***	(0.23305)***	(0.23182)***
mos_7382	0.62435	0.70752	0.71440	0.77041
	(0.28039)**	(0.27609)**	(0.27553)***	(0.27459)***
Constant	-2.65973	-1.63834	-3.09053	-3.55183
	(0.04653)***	(0.03785)***	(0.32517)***	(0.32112)***
Observations	105371	105371	105371	105371
Standard errors in parentheses				
* significant at 10%; ** significant at 5%; *** significant at 1%				

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APPENDIX C. FY 2008 PREDICTED REENLISTMENT RATES BY MOS FOR ALTERNATE SRB MULTIPLES

	SRB Multiple of 0 Model #				SRB Multiple of 1 Model #				SRB Multiple of 2 Model #				SRB Multiple of 3 Model #				SRB Multiple of 4 Model #				SRB Multiple of 5 Model #			
MOS	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
0121	0.35	0.35	0.31	0.36	0.38	0.37	0.33	0.39	0.40	0.40	0.36	0.41	0.43	0.42	0.38	0.43	0.46	0.45	0.41	0.46	0.49	0.48	0.43	0.48
0151	0.46	0.45	0.41	0.46	0.49	0.48	0.43	0.49	0.52	0.50	0.46	0.51	0.55	0.53	0.48	0.54	0.57	0.56	0.51	0.56	0.60	0.58	0.54	0.58
0161	0.45	0.43	0.39	0.42	0.48	0.45	0.41	0.44	0.51	0.48	0.44	0.46	0.54	0.51	0.46	0.49	0.57	0.53	0.49	0.51	0.59	0.56	0.51	0.54
0193	0.27	0.39	0.35	0.42	0.29	0.41	0.37	0.44	0.32	0.44	0.39	0.47	0.35	0.46	0.42	0.49	0.37	0.49	0.44	0.52	0.40	0.52	0.47	0.54
0211	0.11	0.15	0.13	0.14	0.12	0.16	0.14	0.16	0.13	0.18	0.15	0.17	0.14	0.19	0.17	0.18	0.16	0.21	0.18	0.20	0.18	0.23	0.20	0.21
0231	0.27	0.29	0.25	0.27	0.29	0.31	0.27	0.29	0.32	0.34	0.29	0.31	0.34	0.36	0.31	0.33	0.37	0.39	0.34	0.35	0.40	0.41	0.36	0.38
0241	0.58	0.70	0.66	0.70	0.61	0.72	0.68	0.72	0.63	0.74	0.71	0.74	0.66	0.76	0.73	0.76	0.69	0.78	0.75	0.78	0.71	0.80	0.77	0.79
0261	0.17	0.17	0.15	0.16	0.19	0.19	0.16	0.18	0.20	0.21	0.18	0.19	0.22	0.23	0.19	0.21	0.24	0.24	0.21	0.22	0.27	0.26	0.23	0.24
0311	0.20	0.19	0.17	0.18	0.21	0.21	0.18	0.19	0.24	0.23	0.20	0.21	0.26	0.25	0.21	0.23	0.28	0.27	0.23	0.24	0.30	0.29	0.25	0.26
0313	0.18	0.19	0.16	0.17	0.20	0.20	0.18	0.19	0.22	0.22	0.19	0.20	0.24	0.24	0.21	0.22	0.26	0.26	0.22	0.23	0.28	0.28	0.24	0.25
0321	0.25	0.26	0.23	0.24	0.27	0.28	0.24	0.26	0.30	0.30	0.26	0.28	0.32	0.32	0.28	0.30	0.35	0.35	0.31	0.32	0.37	0.37	0.33	0.34
0331	0.20	0.20	0.18	0.19	0.22	0.22	0.19	0.20	0.24	0.24	0.21	0.22	0.26	0.26	0.22	0.24	0.28	0.28	0.24	0.25	0.31	0.30	0.26	0.27
0341	0.18	0.18	0.16	0.17	0.20	0.20	0.17	0.18	0.22	0.22	0.19	0.20	0.24	0.24	0.20	0.21	0.26	0.26	0.22	0.23	0.28	0.28	0.24	0.25
0351	0.19	0.19	0.16	0.17	0.20	0.20	0.17	0.19	0.22	0.22	0.19	0.20	0.24	0.24	0.21	0.22	0.27	0.26	0.22	0.23	0.29	0.28	0.24	0.25
0352	0.21	0.23	0.20	0.21	0.23	0.25	0.22	0.23	0.25	0.27	0.23	0.24	0.27	0.29	0.25	0.26	0.30	0.31	0.27	0.28	0.32	0.33	0.29	0.30
0369	0.06	0.11	0.10	0.11	0.07	0.12	0.11	0.12	0.07	0.13	0.12	0.13	0.08	0.15	0.13	0.14	0.09	0.16	0.14	0.15	0.10	0.18	0.15	0.17
0411	0.34	0.33	0.29	0.32	0.37	0.35	0.31	0.34	0.39	0.38	0.34	0.37	0.42	0.40	0.36	0.39	0.45	0.43	0.38	0.41	0.48	0.46	0.41	0.43
0431	0.37	0.38	0.34	0.37	0.40	0.40	0.36	0.39	0.42	0.43	0.39	0.41	0.45	0.45	0.41	0.44	0.48	0.48	0.44	0.46	0.51	0.51	0.46	0.49
0451	0.29	0.28	0.24	0.27	0.32	0.30	0.26	0.29	0.34	0.32	0.28	0.31	0.37	0.34	0.30	0.33	0.40	0.37	0.32	0.35	0.43	0.39	0.35	0.37
0481	0.22	0.24	0.20	0.22	0.24	0.26	0.22	0.23	0.26	0.28	0.24	0.25	0.29	0.30	0.26	0.27	0.31	0.32	0.28	0.29	0.34	0.35	0.30	0.31
0511	0.27	0.27	0.23	0.26	0.29	0.29	0.25	0.28	0.32	0.31	0.27	0.30	0.34	0.34	0.29	0.32	0.37	0.36	0.31	0.34	0.40	0.38	0.33	0.37
0612	0.25	0.26	0.23	0.25	0.28	0.29	0.25	0.26	0.30	0.31	0.27	0.28	0.33	0.33	0.29	0.30	0.35	0.35	0.31	0.32	0.38	0.38	0.33	0.35
0613	0.22	0.24	0.21	0.24	0.24	0.26	0.22	0.26	0.26	0.28	0.24	0.28	0.28	0.30	0.26	0.30	0.31	0.32	0.28	0.32	0.33	0.35	0.30	0.34
0614	0.21	0.21	0.18	0.20	0.23	0.23	0.20	0.22	0.25	0.25	0.22	0.23	0.28	0.27	0.24	0.25	0.30	0.29	0.25	0.27	0.32	0.31	0.27	0.29
0619	0.42	0.53	0.46	0.47	0.44	0.55	0.49	0.49	0.47	0.58	0.51	0.52	0.50	0.60	0.54	0.54	0.53	0.63	0.56	0.56	0.56	0.65	0.59	0.59
0621	0.27	0.28	0.25	0.27	0.30	0.30	0.27	0.28	0.32	0.33	0.29	0.30	0.35	0.35	0.31	0.33	0.37	0.38	0.33	0.35	0.40	0.40	0.36	0.37
0622	0.18	0.18	0.16	0.17	0.20	0.20	0.17	0.18	0.22	0.22	0.19	0.20	0.24	0.24	0.20	0.21	0.26	0.26	0.22	0.23	0.28	0.28	0.24	0.25
0623	0.48	0.42	0.41	0.50	0.50	0.45	0.43	0.52	0.53	0.48	0.46	0.55	0.56	0.50	0.48	0.57	0.59	0.53	0.51	0.60	0.62	0.56	0.54	0.62
0624	0.24	0.27	0.20	0.22	0.26	0.30	0.22	0.23	0.28	0.32	0.24	0.25	0.31	0.34	0.26	0.27	0.33	0.37	0.28	0.29	0.36	0.39	0.30	0.31
0626	0.09	0.09	0.08	0.08	0.10	0.10	0.08	0.09	0.11	0.11	0.09	0.10	0.12	0.12	0.10	0.11	0.13	0.13	0.11	0.12	0.15	0.14	0.12	0.13
0627	0.20	0.21	0.18	0.19	0.22	0.23	0.20	0.21	0.24	0.25	0.21	0.23	0.26	0.27	0.23	0.24	0.28	0.29	0.25	0.26	0.31	0.31	0.27	0.28

0629		0.20	0.33	0.29	0.32		0.22	0.35	0.31	0.34		0.24	0.37	0.33	0.36		0.26	0.40	0.35	0.38		0.28	0.42	0.38	0.40		0.31	0.45	0.40	0.43
0651		0.18	0.18	0.16	0.19		0.20	0.20	0.17	0.20		0.22	0.22	0.19	0.22		0.24	0.24	0.21	0.23		0.26	0.26	0.22	0.25		0.28	0.28	0.24	0.27
0656		0.18	0.19	0.17	0.19		0.20	0.21	0.18	0.20		0.22	0.22	0.20	0.22		0.24	0.24	0.21	0.23		0.26	0.26	0.23	0.25		0.28	0.28	0.25	0.27
0689		0.29	0.42	0.39	0.44		0.31	0.44	0.42	0.46		0.34	0.47	0.44	0.49		0.36	0.50	0.47	0.51		0.39	0.52	0.49	0.53		0.42	0.55	0.52	0.56
0811		0.23	0.23	0.20	0.22		0.25	0.25	0.22	0.23		0.27	0.27	0.24	0.25		0.29	0.29	0.26	0.27		0.32	0.32	0.28	0.29		0.34	0.34	0.30	0.31
0842		0.25	0.26	0.23	0.23		0.27	0.28	0.24	0.25		0.30	0.31	0.26	0.27		0.32	0.33	0.28	0.29		0.35	0.35	0.30	0.31		0.38	0.38	0.33	0.33
0844		0.27	0.28	0.25	0.27		0.29	0.31	0.27	0.29		0.32	0.33	0.29	0.31		0.34	0.35	0.31	0.33		0.37	0.38	0.34	0.35		0.40	0.40	0.36	0.38
0847		0.35	0.37	0.32	0.36		0.37	0.40	0.35	0.38		0.40	0.42	0.37	0.40		0.43	0.45	0.39	0.42		0.46	0.47	0.42	0.45		0.49	0.50	0.44	0.47
0861		0.26	0.28	0.24	0.26		0.28	0.30	0.26	0.28		0.31	0.32	0.28	0.30		0.33	0.34	0.30	0.32		0.36	0.37	0.32	0.34		0.39	0.39	0.35	0.36
1141		0.29	0.28	0.25	0.27		0.32	0.30	0.26	0.29		0.34	0.33	0.29	0.31		0.37	0.35	0.31	0.33		0.40	0.37	0.33	0.35		0.43	0.40	0.35	0.37
1142		0.29	0.30	0.26	0.28		0.32	0.32	0.28	0.30		0.34	0.34	0.30	0.32		0.37	0.37	0.32	0.34		0.40	0.39	0.34	0.36		0.42	0.42	0.37	0.38
1161		0.26	0.25	0.22	0.24		0.28	0.27	0.24	0.26		0.30	0.30	0.26	0.28		0.33	0.32	0.28	0.30		0.35	0.34	0.30	0.32		0.38	0.37	0.32	0.34
1171		0.31	0.30	0.26	0.28		0.33	0.33	0.28	0.30		0.36	0.35	0.31	0.32		0.39	0.37	0.33	0.35		0.42	0.40	0.35	0.37		0.44	0.42	0.37	0.39
1181		0.26	0.29	0.25	0.28		0.29	0.31	0.27	0.30		0.31	0.34	0.29	0.32		0.34	0.36	0.31	0.34		0.36	0.38	0.34	0.36		0.39	0.41	0.36	0.39
1316		0.26	0.27	0.23	0.25		0.28	0.29	0.25	0.27		0.31	0.31	0.27	0.29		0.33	0.33	0.29	0.31		0.36	0.36	0.31	0.33		0.38	0.38	0.33	0.35
1341		0.26	0.28	0.24	0.26		0.29	0.30	0.26	0.28		0.31	0.32	0.28	0.30		0.34	0.34	0.30	0.32		0.36	0.37	0.32	0.34		0.39	0.39	0.34	0.36
1345		0.24	0.25	0.21	0.23		0.26	0.27	0.23	0.24		0.28	0.29	0.25	0.26		0.31	0.31	0.27	0.28		0.33	0.33	0.29	0.30		0.36	0.36	0.31	0.32
1361		0.31	0.30	0.27	0.29		0.33	0.33	0.29	0.31		0.36	0.35	0.31	0.33		0.39	0.37	0.33	0.35		0.41	0.40	0.35	0.37		0.44	0.42	0.38	0.40
1371		0.25	0.27	0.23	0.24		0.27	0.29	0.25	0.26		0.29	0.31	0.27	0.28		0.32	0.33	0.29	0.30		0.34	0.36	0.31	0.32		0.37	0.38	0.33	0.34
1391		0.28	0.28	0.24	0.26		0.30	0.30	0.26	0.28		0.33	0.32	0.28	0.30		0.35	0.35	0.30	0.32		0.38	0.37	0.32	0.34		0.41	0.40	0.35	0.36
1812		0.28	0.30	0.26	0.27		0.31	0.32	0.28	0.29		0.33	0.35	0.30	0.31		0.36	0.37	0.33	0.33		0.39	0.40	0.35	0.35		0.41	0.42	0.37	0.37
1833		0.26	0.28	0.24	0.25		0.28	0.30	0.26	0.27		0.31	0.32	0.28	0.29		0.33	0.34	0.30	0.31		0.36	0.37	0.32	0.33		0.39	0.39	0.35	0.35
2111		0.31	0.31	0.28	0.31		0.33	0.34	0.30	0.33		0.36	0.36	0.32	0.35		0.39	0.39	0.34	0.37		0.42	0.41	0.37	0.40		0.44	0.44	0.39	0.42
2131		0.25	0.25	0.22	0.24		0.28	0.28	0.24	0.26		0.30	0.30	0.26	0.28		0.33	0.32	0.28	0.30		0.35	0.34	0.30	0.32		0.38	0.37	0.32	0.34
2141		0.25	0.28	0.25	0.27		0.27	0.30	0.27	0.28		0.30	0.32	0.29	0.30		0.32	0.35	0.31	0.33		0.35	0.37	0.33	0.35		0.37	0.40	0.35	0.37
2146		0.31	0.32	0.28	0.29		0.33	0.34	0.30	0.31		0.36	0.37	0.32	0.33		0.38	0.39	0.34	0.36		0.41	0.42	0.37	0.38		0.44	0.44	0.39	0.40
2147		0.26	0.28	0.25	0.26		0.28	0.30	0.27	0.28		0.31	0.33	0.29	0.30		0.33	0.35	0.31	0.32		0.36	0.38	0.33	0.34		0.39	0.40	0.35	0.36
2161		0.24	0.26	0.22	0.25		0.27	0.28	0.24	0.27		0.29	0.30	0.26	0.29		0.31	0.32	0.28	0.31		0.34	0.34	0.30	0.33		0.36	0.37	0.32	0.35
2171		0.23	0.25	0.22	0.23		0.25	0.27	0.23	0.25		0.28	0.29	0.25	0.27		0.30	0.31	0.27	0.29		0.32	0.34	0.29	0.31		0.35	0.36	0.31	0.33
2311		0.32	0.34	0.30	0.33		0.35	0.36	0.32	0.35		0.38	0.39	0.34	0.37		0.40	0.41	0.37	0.39		0.43	0.44	0.39	0.42		0.46	0.46	0.41	0.44
2336		0.63	0.70	0.68	0.69		0.66	0.72	0.70	0.71		0.68	0.74	0.72	0.73		0.71	0.76	0.74	0.75		0.73	0.78	0.76	0.77		0.75	0.80	0.78	0.78
2621		0.27	0.29	0.26	0.29		0.30	0.32	0.28	0.31		0.32	0.34	0.30	0.34		0.35	0.36	0.33	0.36		0.37	0.39	0.35	0.38		0.40	0.41	0.37	0.40
2631		0.25	0.27	0.23	0.26		0.27	0.29	0.25	0.28		0.29	0.31	0.27	0.30		0.32	0.34	0.29	0.32		0.34	0.36	0.31	0.34		0.37	0.39	0.33	0.37
2651		0.25	0.27	0.24	0.27		0.27	0.29	0.26	0.28		0.30	0.31	0.28	0.30		0.32	0.34	0.30	0.33		0.35	0.36	0.32	0.35		0.37	0.38	0.34	0.37
2671		0.13	0.16	0.14	0.15		0.15	0.18	0.15	0.17		0.16	0.19	0.17	0.18		0.18	0.21	0.18	0.19		0.20	0.23	0.20	0.21		0.22	0.25	0.21	0.23
2673		0.18	0.20	0.17	0.22		0.20	0.22	0.19	0.23		0.22	0.24	0.21	0.25		0.24	0.26	0.22	0.27		0.26	0.28	0.24	0.29		0.28	0.30	0.26	0.31
2674		0.19	0.21	0.19	0.22		0.21	0.23	0.20	0.24		0.23	0.25	0.22	0.25		0.25	0.27	0.24	0.27		0.27	0.29	0.26	0.29		0.30	0.31	0.28	0.31
2676		0.19	0.22	0.19	0.22		0.21	0.24	0.21	0.24		0.23	0.26	0.22	0.25		0.25	0.28	0.24	0.27		0.27	0.30	0.26	0.29		0.30	0.32	0.28	0.31
2818		0.97	0.97	0.96	0.97		0.97	0.98	0.97	0.97		0.98	0.98	0.97	0.98		0.98	0.98	0.97	0.98		0.98	0.98	0.98	0.98		0.98	0.98	0.98	0.98

2822		0.25	0.27	0.24	0.28		0.27	0.29	0.26	0.30		0.29	0.31	0.28	0.32		0.32	0.34	0.30	0.34		0.34	0.36	0.32	0.37		0.37	0.39	0.35	0.39
2823		0.38	0.47	0.42	0.41		0.41	0.50	0.44	0.44		0.44	0.53	0.47	0.46		0.47	0.55	0.50	0.48		0.50	0.58	0.52	0.51		0.52	0.60	0.55	0.53
2831		0.28	0.29	0.26	0.28		0.31	0.32	0.28	0.30		0.33	0.34	0.30	0.32		0.36	0.36	0.32	0.34		0.39	0.39	0.34	0.36		0.41	0.41	0.37	0.39
2834		0.27	0.32	0.28	0.29		0.29	0.34	0.30	0.31		0.31	0.37	0.33	0.34		0.34	0.39	0.35	0.36		0.37	0.42	0.37	0.38		0.39	0.44	0.40	0.40
2841		0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		0.99	1.00	0.99	0.99		1.00	1.00	0.99	1.00
2844		0.21	0.24	0.21	0.23		0.23	0.26	0.22	0.25		0.25	0.28	0.24	0.26		0.28	0.30	0.26	0.28		0.30	0.32	0.28	0.30		0.33	0.35	0.30	0.32
2846		0.21	0.23	0.19	0.21		0.23	0.25	0.21	0.23		0.25	0.27	0.23	0.25		0.27	0.29	0.25	0.27		0.29	0.31	0.27	0.29		0.32	0.33	0.29	0.31
2847		0.17	0.20	0.17	0.19		0.19	0.22	0.19	0.21		0.21	0.24	0.21	0.23		0.23	0.26	0.22	0.24		0.25	0.28	0.24	0.26		0.27	0.30	0.26	0.28
2862		0.45	0.62	0.59	0.62		0.47	0.65	0.61	0.64		0.50	0.67	0.63	0.66		0.53	0.70	0.66	0.68		0.56	0.72	0.68	0.70		0.59	0.74	0.70	0.72
2871		0.15	0.17	0.15	0.18		0.17	0.19	0.16	0.19		0.19	0.20	0.18	0.21		0.20	0.22	0.19	0.22		0.22	0.24	0.21	0.24		0.24	0.26	0.23	0.26
2874		0.28	0.36	0.30	0.31		0.30	0.39	0.32	0.33		0.32	0.41	0.35	0.35		0.35	0.44	0.37	0.37		0.38	0.46	0.39	0.39		0.40	0.49	0.42	0.42
2881		0.21	0.24	0.21	0.23		0.24	0.26	0.22	0.25		0.26	0.28	0.24	0.27		0.28	0.30	0.26	0.29		0.30	0.33	0.28	0.31		0.33	0.35	0.30	0.33
2887		0.22	0.25	0.21	0.24		0.24	0.27	0.23	0.26		0.26	0.29	0.25	0.28		0.29	0.32	0.27	0.30		0.31	0.34	0.29	0.32		0.34	0.36	0.31	0.34
3043		0.41	0.41	0.37	0.40		0.44	0.43	0.39	0.43		0.47	0.46	0.42	0.45		0.49	0.49	0.44	0.48		0.52	0.51	0.47	0.50		0.55	0.54	0.49	0.52
3051		0.35	0.34	0.30	0.33		0.37	0.36	0.32	0.35		0.40	0.39	0.34	0.37		0.43	0.41	0.37	0.40		0.46	0.44	0.39	0.42		0.49	0.47	0.42	0.44
3052		0.41	0.41	0.37	0.41		0.44	0.44	0.39	0.43		0.46	0.47	0.42	0.45		0.49	0.49	0.44	0.48		0.52	0.52	0.47	0.50		0.55	0.54	0.49	0.53
3112		0.37	0.37	0.33	0.39		0.39	0.40	0.36	0.41		0.42	0.42	0.38	0.44		0.45	0.45	0.41	0.46		0.48	0.47	0.43	0.49		0.51	0.50	0.46	0.51
3381		0.32	0.33	0.29	0.31		0.35	0.35	0.31	0.33		0.38	0.38	0.33	0.36		0.40	0.40	0.35	0.38		0.43	0.43	0.38	0.40		0.46	0.45	0.40	0.42
3432		0.44	0.43	0.39	0.44		0.46	0.46	0.41	0.46		0.49	0.48	0.44	0.48		0.52	0.51	0.46	0.51		0.55	0.53	0.49	0.53		0.58	0.56	0.51	0.56
3451		0.41	0.41	0.37	0.43		0.44	0.44	0.39	0.46		0.47	0.46	0.42	0.48		0.50	0.49	0.44	0.50		0.52	0.51	0.47	0.53		0.55	0.54	0.50	0.55
3521		0.29	0.31	0.27	0.29		0.32	0.34	0.30	0.32		0.34	0.36	0.32	0.34		0.37	0.39	0.34	0.36		0.40	0.41	0.36	0.38		0.42	0.44	0.39	0.40
3529		0.35	0.54	0.46	0.49		0.38	0.56	0.48	0.51		0.41	0.59	0.51	0.54		0.44	0.61	0.53	0.56		0.47	0.64	0.56	0.58		0.50	0.66	0.58	0.61
3531		0.30	0.31	0.27	0.30		0.33	0.34	0.30	0.32		0.35	0.36	0.32	0.34		0.38	0.38	0.34	0.36		0.41	0.41	0.36	0.38		0.44	0.43	0.39	0.41
3533		0.25	0.25	0.22	0.23		0.27	0.27	0.23	0.25		0.30	0.29	0.25	0.27		0.32	0.32	0.27	0.29		0.35	0.34	0.29	0.31		0.37	0.36	0.32	0.33
3537		0.18	0.26	0.26	0.33		0.20	0.28	0.28	0.35		0.22	0.30	0.31	0.37		0.24	0.33	0.33	0.39		0.26	0.35	0.35	0.42		0.29	0.37	0.37	0.44
4066		0.93	0.93	0.91	0.93		0.94	0.94	0.92	0.94		0.95	0.94	0.93	0.94		0.95	0.95	0.94	0.95		0.96	0.95	0.94	0.95		0.96	0.96	0.95	0.96
4067		0.23	0.24	0.22	0.27		0.25	0.26	0.24	0.29		0.27	0.28	0.26	0.31		0.29	0.30	0.28	0.33		0.32	0.32	0.30	0.35		0.34	0.35	0.32	0.37
4133		0.21	0.33	0.28	0.32		0.23	0.35	0.30	0.34		0.25	0.38	0.32	0.36		0.27	0.40	0.34	0.38		0.30	0.43	0.37	0.41		0.32	0.45	0.39	0.43
4341		0.31	0.30	0.27	0.32		0.34	0.32	0.29	0.34		0.36	0.35	0.31	0.36		0.39	0.37	0.33	0.38		0.42	0.40	0.36	0.41		0.45	0.42	0.38	0.43
4421		0.40	0.37	0.33	0.39		0.43	0.40	0.36	0.41		0.46	0.42	0.38	0.43		0.48	0.45	0.41	0.46		0.51	0.48	0.43	0.48		0.54	0.50	0.46	0.50
4611		0.30	0.28	0.25	0.31		0.32	0.31	0.27	0.33		0.35	0.33	0.29	0.35		0.38	0.35	0.31	0.37		0.40	0.38	0.33	0.39		0.43	0.40	0.35	0.42
4612		0.31	0.27	0.24	0.28		0.33	0.29	0.26	0.30		0.36	0.31	0.28	0.32		0.39	0.33	0.30	0.34		0.42	0.36	0.32	0.36		0.44	0.38	0.34	0.39
4641		0.29	0.28	0.24	0.28		0.32	0.30	0.26	0.30		0.35	0.32	0.28	0.32		0.37	0.35	0.30	0.34		0.40	0.37	0.33	0.36		0.43	0.40	0.35	0.38
4671		0.30	0.29	0.26	0.30		0.33	0.31	0.28	0.32		0.35	0.33	0.30	0.34		0.38	0.36	0.32	0.36		0.41	0.38	0.34	0.39		0.44	0.41	0.37	0.41
5512		0.29	0.27	0.26	0.33		0.31	0.29	0.28	0.36		0.34	0.31	0.30	0.38		0.37	0.34	0.32	0.40		0.39	0.36	0.34	0.42		0.42	0.39	0.37	0.45
5524		0.34	0.36	0.32	0.38		0.36	0.38	0.34	0.40		0.39	0.41	0.37	0.42		0.42	0.43	0.39	0.45		0.45	0.46	0.42	0.47		0.48	0.48	0.44	0.49
5711		0.33	0.33	0.29	0.32		0.35	0.36	0.32	0.35		0.38	0.38	0.34	0.37		0.41	0.41	0.36	0.39		0.44	0.43	0.39	0.41		0.46	0.46	0.41	0.44
5811		0.24	0.25	0.22	0.26		0.27	0.28	0.24	0.28		0.29	0.30	0.26	0.30		0.31	0.32	0.28	0.32		0.34	0.34	0.30	0.34		0.37	0.37	0.32	0.36
5821		0.23	0.37	0.32	0.37		0.25	0.40	0.35	0.39		0.27	0.42	0.37	0.42		0.29	0.45	0.40	0.44		0.32	0.48	0.42	0.47		0.34	0.50	0.45	0.49

5831		0.29	0.30	0.26	0.33		0.32	0.32	0.28	0.35		0.34	0.34	0.30	0.37		0.37	0.37	0.32	0.39		0.40	0.39	0.35	0.42		0.42	0.42	0.37	0.44
5937		0.34	0.32	0.29	0.32		0.37	0.35	0.32	0.34		0.40	0.37	0.34	0.36		0.42	0.40	0.36	0.38		0.45	0.42	0.38	0.41		0.48	0.45	0.41	0.43
5939		0.15	0.13	0.12	0.13		0.16	0.15	0.13	0.14		0.18	0.16	0.14	0.15		0.20	0.18	0.15	0.17		0.22	0.19	0.17	0.18		0.24	0.21	0.18	0.20
5942		0.28	0.30	0.25	0.28		0.31	0.32	0.27	0.30		0.33	0.34	0.29	0.33		0.36	0.37	0.31	0.35		0.39	0.39	0.34	0.37		0.41	0.42	0.36	0.39
5952		0.29	0.33	0.29	0.32		0.31	0.35	0.31	0.34		0.34	0.38	0.34	0.36		0.37	0.40	0.36	0.38		0.39	0.43	0.38	0.41		0.42	0.45	0.41	0.43
5953		0.24	0.27	0.24	0.27		0.26	0.29	0.26	0.29		0.28	0.31	0.28	0.31		0.31	0.33	0.30	0.33		0.33	0.36	0.32	0.35		0.36	0.38	0.34	0.38
5954		0.27	0.30	0.26	0.29		0.30	0.32	0.28	0.31		0.32	0.34	0.30	0.33		0.35	0.37	0.32	0.35		0.37	0.39	0.34	0.37		0.40	0.42	0.37	0.39
5962		0.22	0.24	0.21	0.24		0.25	0.26	0.22	0.25		0.27	0.28	0.24	0.27		0.29	0.30	0.26	0.29		0.32	0.33	0.28	0.31		0.34	0.35	0.30	0.33
5963		0.21	0.24	0.22	0.25		0.23	0.26	0.23	0.27		0.25	0.29	0.25	0.29		0.28	0.31	0.27	0.31		0.30	0.33	0.29	0.33		0.32	0.35	0.31	0.35
5974		0.27	0.28	0.26	0.29		0.30	0.30	0.28	0.31		0.32	0.32	0.30	0.33		0.35	0.35	0.32	0.36		0.37	0.37	0.35	0.38		0.40	0.40	0.37	0.40
5979		0.15	0.18	0.15	0.17		0.16	0.19	0.16	0.19		0.18	0.21	0.17	0.20		0.20	0.23	0.19	0.22		0.22	0.25	0.21	0.24		0.24	0.27	0.22	0.25
6042		0.31	0.33	0.28	0.32		0.34	0.35	0.31	0.34		0.36	0.37	0.33	0.36		0.39	0.40	0.35	0.38		0.42	0.42	0.37	0.41		0.45	0.45	0.40	0.43
6046		0.36	0.38	0.34	0.37		0.38	0.40	0.36	0.40		0.41	0.43	0.38	0.42		0.44	0.45	0.41	0.44		0.47	0.48	0.43	0.47		0.50	0.51	0.46	0.49
6048		0.23	0.27	0.23	0.26		0.25	0.29	0.25	0.28		0.28	0.31	0.27	0.30		0.30	0.33	0.29	0.32		0.33	0.36	0.31	0.35		0.35	0.38	0.34	0.37
6062		0.21	0.25	0.21	0.24		0.24	0.27	0.23	0.25		0.26	0.29	0.25	0.27		0.28	0.31	0.27	0.29		0.30	0.33	0.29	0.31		0.33	0.36	0.31	0.33
6072		0.30	0.34	0.30	0.33		0.32	0.36	0.32	0.36		0.35	0.39	0.34	0.38		0.38	0.41	0.37	0.40		0.40	0.44	0.39	0.42		0.43	0.46	0.42	0.45
6073		0.27	0.30	0.27	0.30		0.29	0.32	0.29	0.32		0.31	0.35	0.31	0.34		0.34	0.37	0.33	0.37		0.37	0.40	0.35	0.39		0.39	0.42	0.38	0.41
6074		0.23	0.25	0.22	0.26		0.25	0.28	0.24	0.28		0.27	0.30	0.26	0.30		0.30	0.32	0.28	0.32		0.32	0.34	0.30	0.34		0.35	0.37	0.33	0.37
6092		0.28	0.32	0.28	0.31		0.30	0.34	0.30	0.34		0.33	0.37	0.33	0.36		0.35	0.39	0.35	0.38		0.38	0.42	0.37	0.40		0.41	0.44	0.40	0.43
6112		0.25	0.29	0.25	0.27		0.27	0.31	0.27	0.29		0.30	0.33	0.29	0.31		0.32	0.35	0.31	0.33		0.35	0.38	0.33	0.35		0.38	0.40	0.36	0.38
6113		0.21	0.24	0.21	0.24		0.23	0.26	0.23	0.25		0.25	0.28	0.25	0.27		0.27	0.30	0.27	0.29		0.29	0.33	0.29	0.31		0.32	0.35	0.31	0.33
6114		0.20	0.23	0.20	0.22		0.22	0.25	0.22	0.24		0.24	0.27	0.24	0.26		0.26	0.29	0.26	0.27		0.28	0.31	0.28	0.29		0.31	0.34	0.30	0.31
6116		0.23	0.25	0.22	0.28		0.25	0.27	0.24	0.30		0.27	0.29	0.26	0.32		0.30	0.31	0.28	0.34		0.32	0.33	0.30	0.36		0.35	0.36	0.32	0.38
6122		0.27	0.32	0.29	0.33		0.29	0.35	0.31	0.35		0.32	0.37	0.34	0.37		0.34	0.40	0.36	0.40		0.37	0.42	0.38	0.42		0.40	0.45	0.41	0.44
6123		0.28	0.33	0.30	0.34		0.30	0.36	0.32	0.36		0.33	0.38	0.34	0.39		0.36	0.41	0.36	0.41		0.38	0.43	0.39	0.43		0.41	0.46	0.41	0.46
6124		0.38	0.43	0.38	0.42		0.40	0.46	0.41	0.45		0.43	0.48	0.43	0.47		0.46	0.51	0.46	0.49		0.49	0.53	0.48	0.52		0.52	0.56	0.51	0.54
6132		0.30	0.33	0.30	0.33		0.32	0.36	0.32	0.36		0.35	0.38	0.34	0.38		0.38	0.41	0.37	0.40		0.40	0.43	0.39	0.42		0.43	0.46	0.41	0.45
6152		0.23	0.28	0.24	0.26		0.25	0.30	0.26	0.28		0.27	0.32	0.28	0.30		0.30	0.35	0.30	0.32		0.32	0.37	0.32	0.34		0.35	0.40	0.35	0.36
6153		0.23	0.28	0.24	0.27		0.25	0.30	0.26	0.28		0.27	0.32	0.28	0.30		0.30	0.34	0.30	0.33		0.32	0.37	0.33	0.35		0.35	0.39	0.35	0.37
6154		0.26	0.30	0.26	0.29		0.29	0.33	0.28	0.31		0.31	0.35	0.30	0.33		0.34	0.38	0.33	0.35		0.36	0.40	0.35	0.37		0.39	0.43	0.37	0.39
6156		0.40	0.47	0.44	0.52		0.43	0.50	0.46	0.54		0.45	0.53	0.49	0.56		0.48	0.55	0.51	0.59		0.51	0.58	0.54	0.61		0.54	0.60	0.56	0.63
6172		0.23	0.26	0.23	0.25		0.25	0.28	0.25	0.27		0.28	0.30	0.26	0.29		0.30	0.32	0.28	0.31		0.32	0.35	0.31	0.33		0.35	0.37	0.33	0.35
6173		0.22	0.25	0.22	0.25		0.24	0.27	0.24	0.27		0.27	0.30	0.26	0.29		0.29	0.32	0.28	0.31		0.31	0.34	0.30	0.33		0.34	0.37	0.33	0.35
6174		0.28	0.32	0.29	0.31		0.31	0.34	0.31	0.33		0.33	0.37	0.33	0.35		0.36	0.39	0.36	0.38		0.39	0.42	0.38	0.40		0.41	0.44	0.40	0.42
6176		0.41	0.42	0.41	0.50		0.44	0.45	0.43	0.53		0.47	0.48	0.46	0.55		0.50	0.50	0.48	0.58		0.53	0.53	0.51	0.60		0.55	0.56	0.53	0.62
6212		0.18	0.22	0.19	0.21		0.20	0.24	0.21	0.22		0.22	0.26	0.22	0.24		0.24	0.28	0.24	0.26		0.26	0.30	0.26	0.28		0.29	0.32	0.28	0.30
6213		0.18	0.22	0.19	0.22		0.20	0.24	0.21	0.23		0.22	0.26	0.22	0.25		0.24	0.28	0.24	0.27		0.26	0.30	0.26	0.29		0.28	0.32	0.28	0.31
6214		0.16	0.18	0.15	0.15		0.18	0.19	0.16	0.16		0.19	0.21	0.17	0.18		0.21	0.23	0.19	0.19		0.23	0.25	0.20	0.21		0.25	0.27	0.22	0.22
6216		0.25	0.28	0.25	0.29		0.27	0.30	0.27	0.31		0.29	0.33	0.29	0.34		0.32	0.35	0.32	0.36		0.34	0.37	0.34	0.38		0.37	0.40	0.36	0.40

6217		0.22	0.27	0.23	0.27		0.24	0.29	0.25	0.29		0.26	0.31	0.27	0.31		0.29	0.33	0.29	0.33		0.31	0.36	0.31	0.35		0.34	0.38	0.34	0.37
6222		0.23	0.30	0.27	0.31		0.25	0.32	0.29	0.33		0.27	0.34	0.31	0.35		0.30	0.37	0.33	0.37		0.32	0.39	0.35	0.40		0.35	0.42	0.38	0.42
6223		0.17	0.22	0.20	0.24		0.19	0.24	0.21	0.26		0.21	0.26	0.23	0.28		0.23	0.28	0.25	0.30		0.25	0.30	0.27	0.32		0.27	0.32	0.29	0.34
6226		0.24	0.29	0.26	0.31		0.26	0.31	0.28	0.33		0.28	0.33	0.30	0.35		0.31	0.36	0.32	0.37		0.33	0.38	0.34	0.40		0.36	0.41	0.37	0.42
6227		0.33	0.37	0.33	0.39		0.36	0.39	0.36	0.41		0.39	0.42	0.38	0.43		0.41	0.44	0.40	0.46		0.44	0.47	0.43	0.48		0.47	0.50	0.45	0.50
6232		0.78	0.78	0.70	0.74		0.80	0.80	0.72	0.76		0.82	0.81	0.74	0.78		0.83	0.83	0.76	0.79		0.85	0.84	0.78	0.81		0.86	0.86	0.80	0.82
6252		0.19	0.24	0.21	0.23		0.21	0.26	0.23	0.24		0.23	0.28	0.25	0.26		0.26	0.30	0.26	0.28		0.28	0.32	0.28	0.30		0.30	0.35	0.31	0.32
6253		0.21	0.26	0.22	0.25		0.23	0.28	0.24	0.27		0.26	0.30	0.26	0.29		0.28	0.32	0.28	0.31		0.30	0.34	0.30	0.33		0.33	0.37	0.32	0.35
6256		0.31	0.36	0.32	0.36		0.34	0.38	0.35	0.39		0.36	0.41	0.37	0.41		0.39	0.43	0.39	0.43		0.42	0.46	0.42	0.46		0.45	0.49	0.44	0.48
6257		0.19	0.23	0.20	0.23		0.21	0.25	0.21	0.25		0.23	0.27	0.23	0.27		0.25	0.29	0.25	0.29		0.27	0.31	0.27	0.31		0.30	0.33	0.29	0.33
6276		0.15	0.18	0.16	0.19		0.17	0.20	0.18	0.20		0.19	0.21	0.19	0.22		0.20	0.23	0.21	0.24		0.22	0.25	0.23	0.26		0.24	0.27	0.24	0.27
6282		0.20	0.24	0.22	0.23		0.22	0.26	0.23	0.25		0.24	0.28	0.25	0.27		0.26	0.30	0.27	0.29		0.29	0.33	0.29	0.31		0.31	0.35	0.31	0.33
6283		0.33	0.38	0.33	0.36		0.36	0.40	0.35	0.39		0.39	0.43	0.38	0.41		0.41	0.45	0.40	0.43		0.44	0.48	0.42	0.46		0.47	0.51	0.45	0.48
6286		0.26	0.29	0.25	0.28		0.29	0.31	0.27	0.30		0.31	0.33	0.29	0.32		0.34	0.36	0.31	0.34		0.36	0.38	0.33	0.36		0.39	0.41	0.36	0.38
6287		0.26	0.30	0.27	0.30		0.28	0.32	0.29	0.32		0.31	0.34	0.31	0.34		0.33	0.37	0.33	0.37		0.36	0.39	0.35	0.39		0.39	0.42	0.38	0.41
6311		0.92	0.92	0.91	0.92		0.93	0.93	0.92	0.93		0.94	0.93	0.92	0.93		0.94	0.94	0.93	0.94		0.95	0.95	0.94	0.95		0.96	0.95	0.94	0.95
6312		0.18	0.20	0.17	0.19		0.19	0.22	0.19	0.21		0.21	0.23	0.20	0.22		0.23	0.25	0.22	0.24		0.25	0.27	0.24	0.26		0.28	0.30	0.26	0.28
6313		0.28	0.30	0.27	0.31		0.30	0.32	0.29	0.33		0.33	0.34	0.31	0.35		0.35	0.37	0.33	0.37		0.38	0.39	0.35	0.40		0.41	0.42	0.38	0.42
6314		0.19	0.20	0.17	0.18		0.20	0.22	0.19	0.20		0.22	0.24	0.21	0.21		0.24	0.26	0.22	0.23		0.27	0.28	0.24	0.25		0.29	0.30	0.26	0.26
6316		0.32	0.34	0.31	0.35		0.35	0.37	0.33	0.37		0.37	0.39	0.35	0.40		0.40	0.42	0.38	0.42		0.43	0.44	0.40	0.44		0.46	0.47	0.43	0.47
6317		0.33	0.34	0.31	0.35		0.35	0.37	0.33	0.38		0.38	0.39	0.35	0.40		0.41	0.42	0.38	0.42		0.43	0.44	0.40	0.44		0.46	0.47	0.43	0.47
6322		0.30	0.32	0.28	0.30		0.33	0.34	0.30	0.32		0.35	0.37	0.32	0.35		0.38	0.39	0.35	0.37		0.41	0.42	0.37	0.39		0.43	0.44	0.39	0.41
6323		0.28	0.32	0.28	0.31		0.31	0.34	0.31	0.33		0.33	0.37	0.33	0.36		0.36	0.39	0.35	0.38		0.38	0.42	0.37	0.40		0.41	0.44	0.40	0.43
6324		0.30	0.33	0.29	0.31		0.32	0.35	0.31	0.33		0.35	0.38	0.33	0.35		0.38	0.40	0.36	0.38		0.40	0.43	0.38	0.40		0.43	0.45	0.40	0.42
6326		0.27	0.29	0.28	0.35		0.29	0.32	0.30	0.38		0.32	0.34	0.32	0.40		0.34	0.36	0.35	0.42		0.37	0.39	0.37	0.45		0.40	0.41	0.39	0.47
6332		0.18	0.21	0.18	0.19		0.20	0.22	0.19	0.21		0.22	0.24	0.21	0.23		0.24	0.26	0.22	0.24		0.26	0.29	0.24	0.26		0.28	0.31	0.26	0.28
6333		0.18	0.20	0.18	0.21		0.20	0.22	0.19	0.23		0.22	0.24	0.21	0.24		0.24	0.26	0.23	0.26		0.26	0.28	0.25	0.28		0.29	0.30	0.27	0.30
6335		0.90	0.92	0.91	0.92		0.91	0.93	0.91	0.92		0.92	0.94	0.92	0.93		0.93	0.94	0.93	0.94		0.93	0.95	0.94	0.94		0.94	0.95	0.94	0.95
6336		0.29	0.32	0.29	0.32		0.32	0.35	0.31	0.34		0.35	0.37	0.33	0.37		0.37	0.39	0.35	0.39		0.40	0.42	0.38	0.41		0.43	0.45	0.40	0.44
6337		0.29	0.32	0.28	0.33		0.31	0.35	0.31	0.35		0.34	0.37	0.33	0.37		0.36	0.40	0.35	0.40		0.39	0.42	0.37	0.42		0.42	0.45	0.40	0.44
6386		0.27	0.28	0.25	0.28		0.30	0.30	0.27	0.30		0.32	0.33	0.29	0.32		0.35	0.35	0.31	0.35		0.37	0.37	0.33	0.37		0.40	0.40	0.36	0.39
6412		0.25	0.29	0.25	0.29		0.27	0.31	0.27	0.31		0.30	0.33	0.29	0.33		0.32	0.36	0.31	0.35		0.35	0.38	0.33	0.37		0.37	0.40	0.36	0.40
6413		0.24	0.28	0.24	0.28		0.26	0.30	0.26	0.29		0.29	0.32	0.28	0.32		0.31	0.35	0.30	0.34		0.33	0.37	0.32	0.36		0.36	0.39	0.35	0.38
6414		0.31	0.43	0.40	0.49		0.33	0.46	0.43	0.51		0.36	0.48	0.45	0.53		0.38	0.51	0.48	0.56		0.41	0.54	0.50	0.58		0.44	0.56	0.53	0.60
6423		0.23	0.26	0.23	0.26		0.26	0.28	0.25	0.28		0.28	0.30	0.27	0.30		0.30	0.33	0.29	0.32		0.33	0.35	0.31	0.35		0.35	0.37	0.33	0.37
6432		0.23	0.25	0.22	0.27		0.26	0.27	0.24	0.29		0.28	0.29	0.26	0.31		0.30	0.32	0.28	0.33		0.33	0.34	0.30	0.35		0.35	0.36	0.32	0.37
6433		0.31	0.32	0.28	0.31		0.33	0.35	0.30	0.33		0.36	0.37	0.32	0.35		0.38	0.40	0.35	0.37		0.41	0.42	0.37	0.39		0.44	0.45	0.39	0.42
6461		0.18	0.19	0.17	0.21		0.20	0.21	0.18	0.22		0.22	0.23	0.20	0.24		0.24	0.25	0.21	0.26		0.26	0.27	0.23	0.27		0.28	0.29	0.25	0.29
6462		0.31	0.32	0.28	0.34		0.33	0.35	0.30	0.36		0.36	0.37	0.33	0.38		0.38	0.40	0.35	0.40		0.41	0.42	0.37	0.43		0.44	0.45	0.40	0.45

6463		0.41	0.42	0.39	0.45		0.44	0.45	0.41	0.47		0.47	0.48	0.44	0.49		0.49	0.50	0.46	0.52		0.52	0.53	0.49	0.54		0.55	0.56	0.51	0.57
6464		0.13	0.16	0.14	0.19		0.14	0.18	0.16	0.20		0.16	0.19	0.17	0.22		0.18	0.21	0.19	0.24		0.19	0.23	0.20	0.25		0.21	0.25	0.22	0.27
6466		0.27	0.30	0.26	0.30		0.29	0.32	0.28	0.32		0.31	0.34	0.30	0.35		0.34	0.37	0.32	0.37		0.37	0.39	0.34	0.39		0.39	0.42	0.37	0.41
6467		0.22	0.23	0.20	0.24		0.24	0.25	0.22	0.26		0.26	0.27	0.23	0.28		0.28	0.29	0.25	0.29		0.31	0.31	0.27	0.32		0.33	0.33	0.29	0.34
6482		0.30	0.33	0.30	0.34		0.33	0.36	0.33	0.37		0.35	0.38	0.35	0.39		0.38	0.41	0.37	0.41		0.41	0.43	0.40	0.44		0.44	0.46	0.42	0.46
6483		0.39	0.41	0.37	0.40		0.42	0.44	0.39	0.42		0.45	0.47	0.41	0.45		0.48	0.49	0.44	0.47		0.51	0.52	0.46	0.49		0.54	0.55	0.49	0.52
6484		0.21	0.23	0.21	0.27		0.23	0.25	0.22	0.28		0.25	0.27	0.24	0.30		0.27	0.29	0.26	0.33		0.30	0.31	0.28	0.35		0.32	0.34	0.30	0.37
6492		0.28	0.32	0.28	0.33		0.30	0.34	0.30	0.35		0.33	0.36	0.32	0.37		0.36	0.39	0.35	0.40		0.38	0.41	0.37	0.42		0.41	0.44	0.39	0.44
6493		0.31	0.35	0.30	0.34		0.34	0.37	0.32	0.36		0.36	0.40	0.34	0.38		0.39	0.42	0.37	0.41		0.42	0.45	0.39	0.43		0.45	0.47	0.41	0.45
6531		0.31	0.31	0.27	0.30		0.33	0.33	0.29	0.32		0.36	0.36	0.31	0.34		0.38	0.38	0.33	0.36		0.41	0.41	0.36	0.38		0.44	0.43	0.38	0.41
6541		0.31	0.32	0.28	0.31		0.34	0.34	0.30	0.33		0.37	0.37	0.32	0.35		0.39	0.39	0.34	0.38		0.42	0.42	0.37	0.40		0.45	0.44	0.39	0.42
6672		0.40	0.41	0.37	0.42		0.43	0.44	0.40	0.44		0.46	0.46	0.42	0.47		0.49	0.49	0.45	0.49		0.52	0.52	0.47	0.51		0.55	0.54	0.50	0.54
6694		0.30	0.29	0.26	0.30		0.32	0.31	0.28	0.32		0.35	0.34	0.30	0.34		0.37	0.36	0.32	0.36		0.40	0.38	0.34	0.39		0.43	0.41	0.37	0.41
6821		0.22	0.23	0.20	0.22		0.24	0.24	0.22	0.24		0.26	0.26	0.23	0.26		0.28	0.29	0.25	0.28		0.30	0.31	0.27	0.30		0.33	0.33	0.29	0.32
6842		0.33	0.40	0.36	0.40		0.35	0.43	0.39	0.42		0.38	0.45	0.41	0.44		0.41	0.48	0.44	0.47		0.43	0.51	0.46	0.49		0.46	0.53	0.49	0.52
7011		0.23	0.25	0.22	0.24		0.26	0.27	0.24	0.26		0.28	0.29	0.26	0.28		0.30	0.32	0.28	0.30		0.33	0.34	0.30	0.32		0.35	0.36	0.32	0.34
7041		0.41	0.41	0.37	0.41		0.43	0.43	0.39	0.43		0.46	0.46	0.42	0.45		0.49	0.49	0.44	0.48		0.52	0.51	0.47	0.50		0.55	0.54	0.49	0.52
7051		0.24	0.25	0.22	0.25		0.26	0.27	0.23	0.27		0.28	0.29	0.25	0.29		0.30	0.31	0.27	0.31		0.33	0.33	0.29	0.33		0.35	0.36	0.31	0.35
7212		0.24	0.25	0.21	0.23		0.26	0.27	0.23	0.25		0.29	0.29	0.25	0.27		0.31	0.31	0.27	0.29		0.34	0.33	0.29	0.31		0.36	0.36	0.31	0.33
7234		0.27	0.31	0.27	0.30		0.29	0.33	0.29	0.32		0.32	0.36	0.31	0.34		0.35	0.38	0.34	0.36		0.37	0.41	0.36	0.38		0.40	0.43	0.38	0.41
7236		0.57	0.64	0.59	0.59		0.60	0.66	0.62	0.61		0.63	0.68	0.64	0.64		0.66	0.71	0.66	0.66		0.68	0.73	0.68	0.68		0.71	0.75	0.71	0.70
7242		0.34	0.37	0.33	0.35		0.36	0.39	0.35	0.37		0.39	0.42	0.38	0.39		0.42	0.44	0.40	0.42		0.45	0.47	0.43	0.44		0.48	0.50	0.45	0.47
7251		0.21	0.16	0.13	0.16		0.23	0.17	0.15	0.17		0.25	0.19	0.16	0.18		0.28	0.20	0.17	0.20		0.30	0.22	0.19	0.21		0.32	0.24	0.21	0.23
7257		0.23	0.26	0.23	0.26		0.25	0.28	0.25	0.28		0.27	0.30	0.26	0.30		0.29	0.32	0.28	0.32		0.32	0.35	0.31	0.34		0.34	0.37	0.33	0.36
7314		0.20	0.24	0.21	0.21		0.22	0.26	0.23	0.23		0.24	0.28	0.24	0.25		0.26	0.30	0.26	0.27		0.28	0.32	0.28	0.29		0.31	0.35	0.31	0.31
7372		0.37	0.41	0.35	0.41		0.40	0.43	0.38	0.43		0.43	0.46	0.40	0.45		0.46	0.49	0.43	0.48		0.49	0.51	0.45	0.50		0.52	0.54	0.48	0.53
7382		0.31	0.33	0.29	0.32		0.34	0.35	0.31	0.34		0.36	0.38	0.33	0.36		0.39	0.40	0.36	0.39		0.42	0.43	0.38	0.41		0.45	0.45	0.41	0.43

APPENDIX D. MICROSOFT EXCEL MODELS

The following table explains the Microsoft Excel models contained in this appendix. The values for the explanatory variables can be changed to reflect the conditions of the Marine Corps at the time of prediction. The values for the explanatory variables in the four models contained in this appendix were used to predict fiscal year 2008 reenlistment rates with an SRB multiple of zero. The table below depicts the values for model #1 only. Each MOS has its own predicted reenlistment probability based on the inputs in the model. Each MOS has its own logit formula for calculating the predicted reenlistment rate at a given SRB multiple.

Variable	Logit Coefficient	Input Value
Constant	-2.65973	1 in all models
SRB Multiple	.116	SRB Multiple to be analyzed (0 in model #1)
0 days deployed	0 (omitted group from models)	USMC wide average for FY07 (.2039206 in model #1)
1-100 days deployed	-.09009	USMC wide average for FY07 (.0216816 in model #1)
101-200 days deployed	-.40787	USMC wide average for FY07 (.1305149 in model #1)
201-300 days deployed	-.37492	USMC wide average for FY07 (.1981105 in model #1)
301-400 days deployed	-.40938	USMC wide average for FY07 (.1930562 in model #1)
>400 days deployed	-.3307	USMC wide average for FY07

		(.2527161 in model #1)
FY03	0 (omitted group from models)	0
FY04	.63848	0
FY05	.55789	0
FY06	.42581	0
FY07	.4727	1 For all MOS Predictions (FY07 is more like FY08 than any other FY in the sample)
Married	.65306	USMC wide average for FY07 (.4692962 in model #1)
Female	-.21988	USMC wide average for FY07 (.0600378 in model #1)
E3	0	USMC wide average for FY07 (.0846481 in model #1)
E4	.77123	USMC wide average for FY07 (.5838451 in model #1)
E5	.97482	USMC wide average for FY07 (.3300897 in model #1)
E6	1.27231	USMC wide average for FY07 (.00147171 model #1)
MOS dummies	Varies by MOS	1 for the MOS being predicted; 0 for all others

Model #1

		Variable	Intercept	SRB Mult	0 Days Deployed	1-100 Days Deployed	101-200 Days Deployed	201-300 Days Deployed
		Coefficient	-2.65973	0.116	0	-0.09003	-0.40787	-0.37492
MOS	***Predicted Probability***	***Logit***	Intercept	SRB Mult	0 Days Deployed	1-100 Days Deployed	101-200 Days Deployed	201-300 Days Deployed
121	0.348699661	-0.624759904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
151	0.458468437	-0.166509904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
161	0.450064547	-0.200409904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
193	0.271131398	-0.988889904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
211	0.106448763	-2.127539904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
231	0.268120397	-1.004179904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
241	0.578688067	0.317390096	1	0	0.2039206	0.0216816	0.1305149	0.1981105
261	0.169104116	-1.591989904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
311	0.195925112	-1.411959904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
313	0.182195965	-1.501539904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
321	0.25069484	-1.094909904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
331	0.197811366	-1.400029904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
341	0.178573834	-1.526039904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
351	0.185478794	-1.479659904	1	0	0.2039206	0.0216816	0.1305149	0.1981105
352	0.209256991	-1.329409904	1	0	0.2039206	0.0216816	0.1305149	0.1981105

301-400 Days Deployed	> 400 Days Deployed	FY03	FY04	FY05	FY06	FY07	Married	Female
-0.40938	-0.3307	0	0.63848	0.55789	0.42581	0.4727	0.65306	-0.21988
301-400 Days Deployed	> 400 Days Deployed	FY03	FY04	FY05	FY06	FY07	Married	Female
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378
0.1930562	0.2527161					1	0.4692962	0.0600378

E3	E4	E5	E6	121	151	161	193	211	231	241
0	0.77123	0.97482	1.27231	0.7872	1.24545	1.21155	0.42307	-0.71558	0.40778	1.72935
E3	E4	E5	E6	121	151	161	193	211	231	241
0.0846481	0.5838451	0.3300897	0.0014171	1						
0.0846481	0.5838451	0.3300897	0.0014171		1					
0.0846481	0.5838451	0.3300897	0.0014171			1				
0.0846481	0.5838451	0.3300897	0.0014171				1			
0.0846481	0.5838451	0.3300897	0.0014171					1		
0.0846481	0.5838451	0.3300897	0.0014171						1	
0.0846481	0.5838451	0.3300897	0.0014171							1
0.0846481	0.5838451	0.3300897	0.0014171							
0.0846481	0.5838451	0.3300897	0.0014171							
0.0846481	0.5838451	0.3300897	0.0014171							
0.0846481	0.5838451	0.3300897	0.0014171							
0.0846481	0.5838451	0.3300897	0.0014171							
0.0846481	0.5838451	0.3300897	0.0014171							
0.0846481	0.5838451	0.3300897	0.0014171							
0.0846481	0.5838451	0.3300897	0.0014171							

Model #2

		Variable	Intercept	SRB Mult	0 Days Deployed	1-100 Days Deployed	101-200 Days Deployed	201-300 Days Deployed
		Coefficient	-1.63834	0.10571	0	-0.06732	-0.3918	-0.39048
MOS	Predicted Probability	Logit	Intercept	SRB Mult	0 Days Deployed	1-100 Days Deployed	101-200 Days Deployed	201-300 Days Deployed
121	0.349065677	-0.62314866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
151	0.450676271	-0.19793866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
161	0.428601652	-0.28755866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
193	0.385049789	-0.46816866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
211	0.147236934	-1.75643866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
231	0.292416051	-0.88367866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
241	0.701604767	0.85495134	1	0	0.2039206	0.0216816	0.1305149	0.1981105
261	0.174740097	-1.55239866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
311	0.194223217	-1.42279866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
313	0.188160298	-1.46200866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
321	0.258960448	-1.05137866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
331	0.203265473	-1.36600866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
341	0.183198078	-1.49482866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
351	0.186259803	-1.47449866	1	0	0.2039206	0.0216816	0.1305149	0.1981105
352	0.228858379	-1.21476866	1	0	0.2039206	0.0216816	0.1305149	0.1981105

301-400 Days Deployed	> 400 Days Deployed	FY03	FY04	FY05	FY06	FY07	121	151
-0.41609	-0.36684	0	0.619	0.53888	0.44807	0.51853	0.79965	1.22486
301-400 Days Deployed	> 400 Days Deployed	FY03	FY04	FY05	FY06	FY07	121	151
0.1930562	0.2527161					1	1	
0.1930562	0.2527161					1		1
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		
0.1930562	0.2527161					1		

161	193	211	231	241	261	311	313	321	331	341	351	352
1.13524	0.95463	-0.33364	0.53912	2.27775	-0.1296	0	-0.03921	0.37142	0.05679	-0.07203	-0.0517	0.20803
161	193	211	231	241	261	311	313	321	331	341	351	352
1												
	1											
		1										
			1									
				1								
					1							
						1						
							1					
								1				
									1			
										1		
											1	
												1

Model #3

		Variable	Intercept	SRB Mult	0 Days Deployed	1-100 Days Deployed
		Coefficient	-3.090534	0.102178	0	-0.0198
MOS	***Predicted Probability***	***Logit***	Intercept	SRB Mult	0 Days Deployed	1-100 Days Deployed
121	0.312608307	-0.78795329	1	0	0.2039206	0.0216816
151	0.408388005	-0.37063329	1	0	0.2039206	0.0216816
161	0.386612662	-0.46157329	1	0	0.2039206	0.0216816
193	0.346639595	-0.63384329	1	0	0.2039206	0.0216816
211	0.128133538	-1.91756329	1	0	0.2039206	0.0216816
231	0.25175138	-1.08929329	1	0	0.2039206	0.0216816
241	0.661694964	0.67085671	1	0	0.2039206	0.0216816
261	0.149007929	-1.74240329	1	0	0.2039206	0.0216816
311	0.166758996	-1.60877329	1	0	0.2039206	0.0216816
313	0.161362754	-1.64812329	1	0	0.2039206	0.0216816
321	0.226282379	-1.22942329	1	0	0.2039206	0.0216816
331	0.175111792	-1.54982329	1	0	0.2039206	0.0216816
341	0.157046045	-1.68037329	1	0	0.2039206	0.0216816
351	0.16032616	-1.65580329	1	0	0.2039206	0.0216816
352	0.198753498	-1.39410329	1	0	0.2039206	0.0216816

101-200 Days Deployed	201-300 Days Deployed	301-400 Days Deployed	> 400 Days Deployed	unemployment rate	mil/civ pay ratio	121	151
-0.34408	-0.3391	-0.37575	-0.33166	-0.09238	2.53602	0.82082	1.23814
101-200 Days Deployed	201-300 Days Deployed	301-400 Days Deployed	> 400 Days Deployed	unemployment rate	mil/civ pay ratio	121	151
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666	1	
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		1
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		
0.1305149	0.1981105	0.1930562	0.2527161	10.33	1.0666		

161	193	211	231	241	261	311	313	321	331	341	351	352
1.1472	0.97493	-0.30879	0.51948	2.27963	-0.13363	0	-0.03935	0.37935	0.05895	-0.0716	-0.04703	0.21467
161	193	211	231	241	261	311	313	321	331	341	351	352
1												
	1											
		1										
			1									
				1								
					1							
						1						
							1					
								1				
									1			
										1		
											1	
												1

Model #4

		Variable	Intercept	SRB Mult	unemployment rate	mil/civ pay ratio
		Coefficient	-3.55183	0.09624	-0.02401	2.14039
MOS	Predicted Probability	Logit	Intercept	SRB Mult	unemployment rate	mil/civ pay ratio
121	0.364488931	-0.555933326	1	0	10.33	1.0666
151	0.463292829	-0.147093326	1	0	10.33	1.0666
161	0.416593487	-0.336773326	1	0	10.33	1.0666
193	0.420280182	-0.321623326	1	0	10.33	1.0666
211	0.144518947	-1.778253326	1	0	10.33	1.0666
231	0.272306172	-0.982953326	1	0	10.33	1.0666
241	0.702749791	0.860426674	1	0	10.33	1.0666
261	0.164014926	-1.628653326	1	0	10.33	1.0666
311	0.179916498	-1.516913326	1	0	10.33	1.0666
313	0.171468778	-1.575253326	1	0	10.33	1.0666
321	0.238973898	-1.158313326	1	0	10.33	1.0666
331	0.187488383	-1.466413326	1	0	10.33	1.0666
341	0.168827015	-1.593963326	1	0	10.33	1.0666
351	0.172562609	-1.567573326	1	0	10.33	1.0666
352	0.210811085	-1.320043326	1	0	10.33	1.0666

121	151	161	193	211	231	241	261	311	313	321	331	341	351
0.96098	1.36982	1.18014	1.19529	-0.26134	0.53396	2.37734	-0.11174	0	-0.05834	0.3586	0.0505	-0.07705	-0.05066
121	151	161	193	211	231	241	261	311	313	321	331	341	351
1													
	1												
		1											
			1										
				1									
					1								
						1							
							1						
								1					
									1				
										1			
											1		
												1	
													1

APPENDIX E. VALIDATION REGRESSION MODEL

Validation Model	reenlist
srb_multiple	0.14790
	(0.01293)***
_1_to_100_gwot_days_deployed	-0.18529
	(0.03333)***
_101_to_200_gwot_days_deployed	-0.50001
	(0.02179)***
_201_to_300_gwot_days_deployed	-0.45482
	(0.02583)***
_301_to_400_gwot_days_deployed	-0.51607
	(0.03126)***
more_than_400_gwot_days_deployed	-0.46551
	(0.03557)***
FY04	0.66074
	(0.02336)***
FY05	0.58583
	(0.02481)***
FY06	0.44755
	(0.02752)***
married	0.63907
	(0.01585)***
female	-0.28433
	(0.03321)***
E4	0.78703
	(0.03087)***
E5	1.01970
	(0.03304)***
E6	1.24511
	(0.16554)***
mos_0121	0.75125
	(0.06047)***
mos_0151	1.26796
	(0.05825)***
mos_0161	1.22258
	(0.14089)***
mos_0193	-0.78022
	(1.14834)
mos_0211	-1.30314
	(1.10361)
mos_0231	0.42392
	(0.09639)***

mos_0241	1.54764
	(0.82911)*
mos_0261	-0.07097
	(0.22923)
mos_0313	-0.08197
	(0.10364)
mos_0321	0.25994
	(0.10667)**
mos_0331	0.02229
	(0.05858)
mos_0341	-0.12468
	(0.05958)**
mos_0351	-0.04405
	(0.06884)
mos_0352	0.16617
	(0.09196)*
mos_0369	-1.20751
	(0.78383)
mos_0411	0.77015
	(0.09508)***
mos_0431	0.85587
	(0.08704)***
mos_0451	0.54847
	(0.21992)**
mos_0481	0.19206
	(0.10433)*
mos_0511	0.37713
	(0.18874)**
mos_0612	0.18721
	(0.08498)**
mos_0613	-0.08673
	(0.25273)
mos_0614	-0.01982
	(0.17043)
mos_0619	1.15920
	(1.42039)
mos_0621	0.37841
	(0.05056)***
mos_0622	-0.13279
	(0.11801)
mos_0624	0.25391
	(0.66843)
mos_0626	-0.92866
	(0.75520)

mos_0627	-0.07681
	(0.19158)
mos_0651	-0.17100
	(0.10282)*
mos_0656	-0.17202
	(0.09368)*
mos_0811	0.17332
	(0.06782)**
mos_0842	0.37389
	(0.25505)
mos_0844	0.40822
	(0.10392)***
mos_0847	0.98688
	(0.29040)***
mos_0861	0.26779
	(0.15872)*
mos_1141	0.58180
	(0.11701)***
mos_1142	0.63949
	(0.10630)***
mos_1161	0.40817
	(0.14398)***
mos_1171	0.60825
	(0.10314)***
mos_1181	0.44234
	(0.28399)
mos_1316	0.45472
	(0.16601)***
mos_1341	0.40224
	(0.08559)***
mos_1345	0.29599
	(0.08389)***
mos_1361	0.72630
	(0.21695)***
mos_1371	0.40091
	(0.06771)***
mos_1391	0.55723
	(0.08548)***
mos_1812	0.51218
	(0.12253)***
mos_1833	0.45843
	(0.07253)***
mos_2111	0.65740
	(0.08267)***

mos_2131	0.23083
	(0.18888)
mos_2141	0.42893
	(0.10778)***
mos_2146	0.64984
	(0.14590)***
mos_2147	0.31230
	(0.14591)**
mos_2161	-0.02728
	(0.23568)
mos_2171	0.36467
	(0.14222)**
mos_2311	0.71044
	(0.08149)***
mos_2336	1.13150
	(0.94073)
mos_2621	0.37889
	(0.12188)***
mos_2631	0.38039
	(0.23440)
mos_2651	0.24935
	(0.16324)
mos_2671	-0.59257
	(0.20854)***
mos_2673	-0.25756
	(0.31301)
mos_2674	-0.29985
	(0.21662)
mos_2676	-0.08947
	(0.22784)
mos_2818	4.87626
	(1.01990)***
mos_2822	0.17938
	(0.23890)
mos_2823	0.94616
	(0.61219)
mos_2831	0.47223
	(0.19049)**
mos_2834	0.33029
	(0.64372)
mos_2841	6.23141
	(1.00508)***
mos_2844	-0.03232
	(0.09446)

mos_2846	-0.10463
	(0.12052)
mos_2847	-0.28856
	(0.11663)**
mos_2871	-0.14800
	(0.30542)
mos_2874	0.50680
	(1.24095)
mos_2881	0.18929
	(0.18111)
mos_2887	0.34202
	(0.35736)
mos_3043	1.09788
	(0.05991)***
mos_3051	0.77941
	(0.06491)***
mos_3052	0.97105
	(0.18465)***
mos_3112	0.82956
	(0.11668)***
mos_3381	0.67828
	(0.06661)***
mos_3432	1.27355
	(0.09991)***
mos_3451	1.13115
	(0.14446)***
mos_3521	0.59202
	(0.05846)***
mos_3529	0.88808
	(1.02079)
mos_3531	0.61757
	(0.05317)***
mos_3533	0.31175
	(0.07715)***
mos_4066	4.05892
	(0.34929)***
mos_4067	0.12252
	(0.21487)
mos_4133	0.14179
	(1.28895)
mos_4341	0.69642
	(0.17225)***
mos_4421	0.92789
	(0.13519)***

mos_4611	0.73855
	(0.33560)**
mos_4612	0.52847
	(0.31496)*
mos_4641	0.49562
	(0.20517)**
mos_4671	0.47714
	(0.24702)*
mos_5524	0.81366
	(0.10951)***
mos_5711	0.67232
	(0.10017)***
mos_5811	0.27068
	(0.05922)***
mos_5821	-0.65814
	(1.18328)
mos_5831	0.48426
	(0.11496)***
mos_5937	0.73245
	(0.21173)***
mos_5939	-0.99970
	(1.05010)
mos_5942	0.67239
	(0.19523)***
mos_5952	0.40773
	(0.24051)*
mos_5953	0.33744
	(0.18768)*
mos_5954	0.50816
	(0.19611)***
mos_5962	0.08353
	(0.22041)
mos_5963	0.09934
	(0.30271)
mos_5979	-0.64349
	(0.76926)
mos_6042	0.52072
	(0.16042)***
mos_6046	0.79547
	(0.09362)***
mos_6048	0.10307
	(0.11709)
mos_6062	0.11379
	(0.17145)

mos_6072	0.51068
	(0.11290)***
mos_6073	0.46571
	(0.14220)***
mos_6074	-0.16710
	(0.32098)
mos_6092	0.45061
	(0.13253)***
mos_6112	0.20683
	(0.13175)
mos_6113	0.13373
	(0.12981)
mos_6114	0.06044
	(0.12494)
mos_6116	0.73285
	(0.62598)
mos_6122	0.33583
	(0.23458)
mos_6123	0.47114
	(0.20399)**
mos_6124	0.93919
	(0.24724)***
mos_6132	0.58698
	(0.20501)***
mos_6152	0.17091
	(0.14936)
mos_6153	0.24650
	(0.12946)*
mos_6154	0.39096
	(0.12718)***
mos_6156	1.15115
	(0.74901)
mos_6172	0.17035
	(0.13459)
mos_6173	0.22232
	(0.15014)
mos_6174	0.41988
	(0.21944)*
mos_6212	-0.17556
	(0.17501)
mos_6213	-0.07569
	(0.44029)
mos_6214	-0.20341
	(0.45172)

mos_6216	0.28885
	(0.23934)
mos_6217	0.06091
	(0.13828)
mos_6222	0.24932
	(0.27242)
mos_6223	-0.94884
	(0.54918)*
mos_6226	0.02089
	(0.32337)
mos_6227	0.50703
	(0.22884)**
mos_6232	2.68435
	(0.82271)***
mos_6252	-0.02495
	(0.17961)
mos_6253	0.15389
	(0.35320)
mos_6256	0.53566
	(0.20877)**
mos_6257	-0.21086
	(0.18114)
mos_6276	-0.42005
	(0.26913)
mos_6282	-0.00905
	(0.32499)
mos_6283	0.49643
	(0.49575)
mos_6286	0.39152
	(0.46758)
mos_6287	0.32757
	(0.26914)
mos_6311	3.49874
	(0.76560)***
mos_6312	-0.29670
	(0.23972)
mos_6313	0.65605
	(0.31922)**
mos_6314	-0.25867
	(0.51408)
mos_6316	0.53397
	(0.27428)*
mos_6317	0.78014
	(0.15320)***

mos_6322	0.54410
	(0.14444)***
mos_6323	0.41534
	(0.11953)***
mos_6324	0.45643
	(0.12498)***
mos_6326	0.48627
	(0.73930)
mos_6332	-0.30834
	(0.23355)
mos_6333	0.03524
	(0.31621)
mos_6335	3.62107
	(1.05464)***
mos_6336	0.24948
	(0.29778)
mos_6337	0.55356
	(0.15495)***
mos_6386	0.49142
	(0.32677)
mos_6412	0.31744
	(0.16978)*
mos_6413	0.26839
	(0.14323)*
mos_6423	0.17743
	(0.21395)
mos_6432	0.28750
	(0.19011)
mos_6433	0.55285
	(0.19053)***
mos_6461	-0.09479
	(0.33604)
mos_6462	0.65177
	(0.27848)**
mos_6463	1.21847
	(0.37959)***
mos_6464	-0.62040
	(0.42951)
mos_6466	0.41242
	(0.27324)
mos_6467	-0.12538
	(0.23762)
mos_6482	0.40553
	(0.25977)

mos_6483	0.97739
	(0.22112)***
mos_6484	-0.16739
	(0.27907)
mos_6492	0.39614
	(0.12837)***
mos_6493	0.63672
	(0.37075)*
mos_6531	0.59139
	(0.07609)***
mos_6541	0.63390
	(0.08800)***
mos_6672	0.99569
	(0.07955)***
mos_6694	0.62292
	(0.17402)***
mos_6821	0.16069
	(0.20161)
mos_6842	0.55396
	(0.57085)
mos_7011	0.35857
	(0.15736)**
mos_7041	1.04218
	(0.10572)***
mos_7051	0.30428
	(0.09511)***
mos_7212	0.23244
	(0.12092)*
mos_7234	0.50848
	(0.18725)***
mos_7236	1.92711
	(0.85875)**
mos_7242	0.79838
	(0.16887)***
mos_7251	0.11949
	(1.11093)
mos_7257	0.12049
	(0.11225)
mos_7314	0.29318
	(0.36252)
mos_7372	0.88412
	(0.27059)***
mos_7382	0.61505
	(0.32424)*

Constant	-2.66767
	(0.04999)***
Observations	84191
Standard errors in parentheses	
* significant at 10%; ** significant at 5%; *** significant at 1%	

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APPENDIX F. FY07 PREDICTION RESULTS (USMC WIDE MEAN VALUES FOR X'S)

MOS	Predicted Reenlist Rate	Actual 07 Reenlist Rate	Percent Error
mos_0121	0.32	0.44	(0.27)
mos_0151	0.44	0.48	(0.08)
mos_0161	0.43	0.45	(0.06)
mos_0211	0.11	0.33	(0.67)
mos_0231	0.41	0.31	0.35
mos_0261	0.30	0.15	1.02
mos_0311	0.28	0.24	0.19
mos_0313	0.27	0.24	0.13
mos_0321	0.37	0.36	0.04
mos_0331	0.29	0.24	0.18
mos_0341	0.26	0.23	0.11
mos_0351	0.28	0.21	0.33
mos_0352	0.34	0.23	0.49
mos_0411	0.35	0.36	(0.01)
mos_0431	0.37	0.43	(0.12)
mos_0451	0.32	0.32	0.01
mos_0481	0.24	0.24	(0.00)
mos_0511	0.32	0.37	(0.14)
mos_0612	0.25	0.37	(0.34)
mos_0613	0.19	0.30	(0.38)
mos_0614	0.21	0.31	(0.31)
mos_0621	0.27	0.33	(0.19)
mos_0622	0.18	0.26	(0.31)
mos_0627	0.23	0.44	(0.48)
mos_0651	0.18	0.26	(0.31)
mos_0656	0.18	0.26	(0.33)
mos_0811	0.29	0.29	0.01
mos_0842	0.27	0.26	0.04
mos_0844	0.34	0.35	(0.02)
mos_0847	0.42	0.13	2.39
mos_0861	0.38	0.41	(0.09)
mos_1141	0.28	0.23	0.20
mos_1142	0.31	0.25	0.26
mos_1161	0.25	0.22	0.11
mos_1171	0.29	0.32	(0.11)
mos_1316	0.26	0.21	0.20
mos_1341	0.25	0.28	(0.12)
mos_1345	0.24	0.25	(0.04)
mos_1361	0.31	0.22	0.40

mos_1371	0.29	0.25	0.15
mos_1391	0.28	0.24	0.15
mos_1812	0.33	0.32	0.03
mos_1833	0.33	0.25	0.34
mos_2111	0.30	0.30	0.01
mos_2131	0.24	0.36	(0.32)
mos_2141	0.33	0.25	0.31
mos_2146	0.40	0.33	0.21
mos_2147	0.32	0.41	(0.23)
mos_2161	0.21	0.46	(0.54)
mos_2171	0.30	0.17	0.76
mos_2311	0.34	0.33	0.05
mos_2621	0.30	0.33	(0.10)
mos_2631	0.37	0.28	0.32
mos_2651	0.35	0.38	(0.08)
mos_2671	0.20	0.24	(0.17)
mos_2673	0.26	0.33	(0.21)
mos_2674	0.25	0.52	(0.51)
mos_2676	0.27	0.30	(0.10)
mos_2818	0.97	1.00	(0.03)
mos_2822	0.26	0.40	(0.35)
mos_2831	0.39	0.44	(0.11)
mos_2841	0.99	1.00	(0.01)
mos_2844	0.25	0.40	(0.38)
mos_2846	0.21	0.38	(0.45)
mos_2847	0.18	0.30	(0.40)
mos_2871	0.18	0.08	1.16
mos_2881	0.31	0.19	0.66
mos_2887	0.34	0.11	2.07
mos_3043	0.40	0.41	(0.02)
mos_3051	0.32	0.38	(0.14)
mos_3052	0.37	0.49	(0.25)
mos_3112	0.33	0.45	(0.26)
mos_3381	0.30	0.36	(0.16)
mos_3432	0.46	0.38	0.20
mos_3451	0.44	0.41	0.08
mos_3521	0.30	0.31	(0.02)
mos_3531	0.30	0.32	(0.05)
mos_3533	0.24	0.29	(0.15)
mos_4066	0.93	1.00	(0.07)
mos_4341	0.37	0.28	0.33
mos_4421	0.36	0.53	(0.32)
mos_4612	0.29	0.42	(0.31)
mos_4641	0.26	0.36	(0.27)

mos_4671	0.28	0.43	(0.36)
mos_5524	0.36	0.34	0.08
mos_5711	0.33	0.36	(0.09)
mos_5811	0.25	0.29	(0.13)
mos_5831	0.28	0.38	(0.28)
mos_5939	0.13	0.24	(0.46)
mos_5942	0.30	0.10	2.16
mos_5952	0.25	0.50	(0.50)
mos_5953	0.24	0.18	0.32
mos_5954	0.27	0.27	0.00
mos_5962	0.19	0.56	(0.65)
mos_5979	0.10	0.25	(0.59)
mos_6042	0.32	0.49	(0.35)
mos_6046	0.36	0.44	(0.18)
mos_6048	0.22	0.40	(0.46)
mos_6062	0.22	0.27	(0.18)
mos_6072	0.30	0.41	(0.28)
mos_6073	0.29	0.28	0.05
mos_6074	0.19	0.52	(0.64)
mos_6092	0.30	0.35	(0.15)
mos_6112	0.25	0.40	(0.37)
mos_6113	0.25	0.21	0.22
mos_6114	0.24	0.22	0.07
mos_6116	0.38	0.21	0.78
mos_6122	0.28	0.40	(0.31)
mos_6123	0.34	0.33	0.01
mos_6124	0.47	0.36	0.28
mos_6132	0.31	0.31	0.03
mos_6152	0.23	0.31	(0.26)
mos_6153	0.26	0.27	(0.03)
mos_6154	0.29	0.35	(0.19)
mos_6156	0.48	0.50	(0.03)
mos_6172	0.29	0.35	(0.16)
mos_6173	0.30	0.29	0.04
mos_6174	0.38	0.39	(0.03)
mos_6212	0.18	0.33	(0.47)
mos_6213	0.19	0.23	(0.17)
mos_6214	0.18	0.25	(0.27)
mos_6216	0.27	0.34	(0.22)
mos_6217	0.23	0.40	(0.43)
mos_6222	0.26	0.31	(0.17)
mos_6226	0.21	0.50	(0.59)
mos_6227	0.31	0.63	(0.50)
mos_6252	0.21	0.21	0.02

mos_6253	0.24	0.25	(0.03)
mos_6256	0.29	0.50	(0.42)
mos_6257	0.17	0.36	(0.53)
mos_6276	0.18	0.28	(0.33)
mos_6282	0.19	0.31	(0.38)
mos_6283	0.36	0.60	(0.40)
mos_6286	0.27	0.33	(0.18)
mos_6287	0.26	0.35	(0.26)
mos_6312	0.18	0.30	(0.39)
mos_6313	0.36	0.10	2.63
mos_6314	0.20	0.33	(0.41)
mos_6316	0.32	0.60	(0.47)
mos_6317	0.39	0.27	0.45
mos_6322	0.34	0.34	(0.01)
mos_6323	0.34	0.41	(0.17)
mos_6324	0.33	0.48	(0.31)
mos_6326	0.39	0.42	(0.07)
mos_6332	0.20	0.42	(0.53)
mos_6333	0.23	0.15	0.52
mos_6336	0.31	0.56	(0.45)
mos_6337	0.34	0.24	0.41
mos_6386	0.33	0.22	0.46
mos_6412	0.25	0.28	(0.12)
mos_6413	0.24	0.28	(0.15)
mos_6423	0.22	0.31	(0.28)
mos_6432	0.27	0.19	0.41
mos_6433	0.31	0.38	(0.20)
mos_6461	0.21	0.25	(0.15)
mos_6462	0.34	0.22	0.55
mos_6463	0.54	0.29	0.88
mos_6464	0.11	0.50	(0.79)
mos_6466	0.28	0.29	(0.03)
mos_6467	0.23	0.43	(0.45)
mos_6482	0.29	0.46	(0.36)
mos_6483	0.40	0.40	(0.00)
mos_6484	0.20	0.50	(0.60)
mos_6492	0.27	0.41	(0.33)
mos_6493	0.36	0.36	(0.02)
mos_6531	0.33	0.35	(0.05)
mos_6541	0.34	0.35	(0.03)
mos_6672	0.43	0.53	(0.19)
mos_6694	0.31	0.29	0.06
mos_6821	0.30	0.23	0.34
mos_6842	0.39	0.50	(0.22)

mos_7011	0.25	0.19	0.37
mos_7041	0.42	0.47	(0.11)
mos_7051	0.24	0.23	0.05
mos_7212	0.30	0.26	0.14
mos_7234	0.38	0.28	0.35
mos_7236	0.72	0.50	0.43
mos_7242	0.40	0.36	0.10
mos_7257	0.34	0.40	(0.14)
mos_7314	0.31	0.09	2.46
mos_7372	0.38	0.47	(0.19)
mos_7382	0.32	0.33	(0.04)
		Average Total Percent Error	0.32

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APPENDIX G. VALIDATION REGRESSION MODEL—OMITS DEPLOYMENT VARIABLES

Validation Model – Omits Deployment Tempo	Coefficient Estimates
srb_multiple	0.14234
	(0.01278)***
FY04	0.57164
	(0.02296)***
FY05	0.43219
	(0.02369)***
FY06	0.25996
	(0.02559)***
married	0.64446
	(0.01575)***
female	-0.18757
	(0.03282)***
E4	0.78044
	(0.03076)***
E5	1.02273
	(0.03293)***
E6	1.32367
	(0.16440)***
mos_0121	0.93706
	(0.05978)***
mos_0151	1.43827
	(0.05764)***
mos_0161	1.25329
	(0.14009)***
mos_0193	-0.56290
	(1.14601)
mos_0211	-1.30024
	(1.10679)
mos_0231	0.42832
	(0.09572)***
mos_0241	1.62314
	(0.82040)**
mos_0261	-0.04255
	(0.22806)
mos_0313	-0.12062
	(0.10325)
mos_0321	0.22351
	(0.10615)**

mos_0331	0.01303
	(0.05840)
mos_0341	-0.12685
	(0.05941)**
mos_0351	-0.04242
	(0.06859)
mos_0352	0.13927
	(0.09169)
mos_0369	-1.14750
	(0.78018)
mos_0411	0.82249
	(0.09459)***
mos_0431	0.89360
	(0.08675)***
mos_0451	0.58775
	(0.21941)***
mos_0481	0.17015
	(0.10390)
mos_0511	0.46116
	(0.18751)**
mos_0612	0.18126
	(0.08475)**
mos_0613	0.06364
	(0.25080)
mos_0614	-0.02652
	(0.16993)
mos_0619	1.03681
	(1.41846)
mos_0621	0.37632
	(0.05034)***
mos_0622	-0.15951
	(0.11762)
mos_0624	0.24681
	(0.66466)
mos_0626	-0.88154
	(0.74989)
mos_0627	-0.09287
	(0.19112)
mos_0651	-0.05397
	(0.10228)
mos_0656	-0.08249
	(0.09325)
mos_0811	0.16701
	(0.06744)**

mos_0842	0.32860
	(0.25329)
mos_0844	0.44128
	(0.10325)***
mos_0847	1.05794
	(0.28970)***
mos_0861	0.27899
	(0.15820)*
mos_1141	0.61067
	(0.11624)***
mos_1142	0.64615
	(0.10582)***
mos_1161	0.44231
	(0.14363)***
mos_1171	0.61651
	(0.10263)***
mos_1181	0.49638
	(0.28214)*
mos_1316	0.48311
	(0.16527)***
mos_1341	0.42790
	(0.08524)***
mos_1345	0.28201
	(0.08358)***
mos_1361	0.75966
	(0.21536)***
mos_1371	0.37538
	(0.06736)***
mos_1391	0.57224
	(0.08507)***
mos_1812	0.44124
	(0.12216)***
mos_1833	0.40653
	(0.07209)***
mos_2111	0.75084
	(0.08214)***
mos_2131	0.25346
	(0.18867)
mos_2141	0.42233
	(0.10718)***
mos_2146	0.60980
	(0.14518)***
mos_2147	0.28456
	(0.14569)*

mos_2161	0.07092
	(0.23427)
mos_2171	0.37228
	(0.14155)***
mos_2311	0.75112
	(0.08092)***
mos_2336	1.02110
	(0.93222)
mos_2621	0.47928
	(0.12140)***
mos_2631	0.45243
	(0.23375)*
mos_2651	0.30605
	(0.16267)*
mos_2671	-0.56234
	(0.20727)***
mos_2673	-0.04902
	(0.31118)
mos_2674	-0.14555
	(0.21566)
mos_2676	0.02076
	(0.22650)
mos_2818	5.02863
	(1.01905)***
mos_2822	0.33114
	(0.23831)
mos_2823	0.75533
	(0.61407)
mos_2831	0.49381
	(0.18953)***
mos_2834	0.27173
	(0.64122)
mos_2841	6.36700
	(1.00493)***
mos_2844	0.00240
	(0.09403)
mos_2846	-0.06586
	(0.12011)
mos_2847	-0.23561
	(0.11615)**
mos_2871	-0.02918
	(0.30443)
mos_2874	0.39350
	(1.24100)

mos_2881	0.26600
	(0.18021)
mos_2887	0.39334
	(0.35329)
mos_3043	1.18728
	(0.05953)***
mos_3051	0.84627
	(0.06452)***
mos_3052	1.04707
	(0.18403)***
mos_3112	1.03393
	(0.11596)***
mos_3381	0.71457
	(0.06629)***
mos_3432	1.41843
	(0.09918)***
mos_3451	1.34841
	(0.14313)***
mos_3521	0.60373
	(0.05823)***
mos_3529	0.85591
	(1.02044)
mos_3531	0.65578
	(0.05289)***
mos_3533	0.28640
	(0.07689)***
mos_4066	4.25084
	(0.34873)***
mos_4067	0.36247
	(0.21421)*
mos_4133	0.21283
	(1.29213)
mos_4341	0.86698
	(0.17063)***
mos_4421	1.10289
	(0.13416)***
mos_4611	1.01579
	(0.33376)***
mos_4612	0.70427
	(0.31397)**
mos_4641	0.61157
	(0.20386)***
mos_4671	0.63920
	(0.24460)***

mos_5524	1.01588
	(0.10866)***
mos_5711	0.72808
	(0.09966)***
mos_5811	0.40104
	(0.05868)***
mos_5821	-0.43400
	(1.16848)
mos_5831	0.77775
	(0.11407)***
mos_5937	0.76600
	(0.21097)***
mos_5939	-0.97217
	(1.04910)
mos_5942	0.74354
	(0.19417)***
mos_5952	0.44739
	(0.23912)*
mos_5953	0.43664
	(0.18649)**
mos_5954	0.58834
	(0.19537)***
mos_5962	0.17689
	(0.21882)
mos_5963	0.26242
	(0.30035)
mos_5979	-0.50264
	(0.76646)
mos_6042	0.60598
	(0.15959)***
mos_6046	0.87661
	(0.09312)***
mos_6048	0.19689
	(0.11654)*
mos_6062	0.18885
	(0.17059)
mos_6072	0.61776
	(0.11240)***
mos_6073	0.57673
	(0.14151)***
mos_6074	0.02464
	(0.31898)
mos_6092	0.53457
	(0.13195)***

mos_6112	0.22999
	(0.13125)*
mos_6113	0.20533
	(0.12914)
mos_6114	0.08469
	(0.12439)
mos_6116	1.03517
	(0.62525)*
mos_6122	0.47436
	(0.23326)**
mos_6123	0.65420
	(0.20351)***
mos_6124	1.03184
	(0.24572)***
mos_6132	0.71393
	(0.20413)***
mos_6152	0.15121
	(0.14905)
mos_6153	0.27855
	(0.12872)**
mos_6154	0.41584
	(0.12699)***
mos_6156	1.41584
	(0.74457)*
mos_6172	0.21244
	(0.13414)
mos_6173	0.28840
	(0.14929)*
mos_6174	0.43272
	(0.21833)**
mos_6212	-0.17586
	(0.17446)
mos_6213	0.03555
	(0.43889)
mos_6214	-0.28538
	(0.45250)
mos_6216	0.42988
	(0.23867)*
mos_6217	0.17059
	(0.13750)
mos_6222	0.37723
	(0.27002)
mos_6223	-0.69089
	(0.54822)

mos_6226	0.25884
	(0.32268)
mos_6227	0.67930
	(0.22802)***
mos_6232	2.78765
	(0.82068)***
mos_6252	-0.01543
	(0.17883)
mos_6253	0.27932
	(0.35136)
mos_6256	0.63696
	(0.20808)***
mos_6257	-0.08386
	(0.18020)
mos_6276	-0.36491
	(0.26734)
mos_6282	-0.01597
	(0.32307)
mos_6283	0.58376
	(0.49449)
mos_6286	0.50446
	(0.46118)
mos_6287	0.44044
	(0.26755)*
mos_6311	3.66332
	(0.76424)***
mos_6312	-0.22852
	(0.23864)
mos_6313	0.80081
	(0.31788)**
mos_6314	-0.32689
	(0.51165)
mos_6316	0.63903
	(0.27281)**
mos_6317	0.90543
	(0.15253)***
mos_6322	0.57805
	(0.14380)***
mos_6323	0.48799
	(0.11895)***
mos_6324	0.46602
	(0.12445)***
mos_6326	0.82398
	(0.73801)

mos_6332	-0.27900
	(0.23277)
mos_6333	0.18806
	(0.31536)
mos_6335	3.67029
	(1.05510)***
mos_6336	0.38900
	(0.29487)
mos_6337	0.69841
	(0.15427)***
mos_6386	0.60080
	(0.32576)*
mos_6412	0.44930
	(0.16903)***
mos_6413	0.37114
	(0.14231)***
mos_6423	0.32527
	(0.21291)
mos_6432	0.45168
	(0.18897)**
mos_6433	0.61558
	(0.18981)***
mos_6461	0.09055
	(0.33484)
mos_6462	0.86698
	(0.27765)***
mos_6463	1.43167
	(0.37302)***
mos_6464	-0.34114
	(0.42912)
mos_6466	0.56758
	(0.27151)**
mos_6467	-0.01068
	(0.23710)
mos_6482	0.53621
	(0.25883)**
mos_6483	1.04630
	(0.21987)***
mos_6484	0.09520
	(0.27868)
mos_6492	0.56781
	(0.12750)***
mos_6493	0.79289
	(0.36547)**

mos_6531	0.64972
	(0.07566)***
mos_6541	0.72827
	(0.08746)***
mos_6672	1.11930
	(0.07908)***
mos_6694	0.77739
	(0.17333)***
mos_6821	0.24749
	(0.19948)
mos_6842	0.65416
	(0.57115)
mos_7011	0.42702
	(0.15636)***
mos_7041	1.13235
	(0.10494)***
mos_7051	0.43649
	(0.09444)***
mos_7212	0.26256
	(0.12011)**
mos_7234	0.53347
	(0.18624)***
mos_7236	1.76910
	(0.85311)**
mos_7242	0.77599
	(0.16798)***
mos_7251	0.21996
	(1.10710)
mos_7257	0.20462
	(0.11118)*
mos_7314	0.17047
	(0.36162)
mos_7372	0.97051
	(0.26972)***
mos_7382	0.64425
	(0.32255)**
Constant	-2.87832
	(0.04925)***
Observations	84191
Standard errors in parentheses	
* significant at 10%; ** significant at 5%; *** significant at 1%	

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